



CHEETAL

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Yellow Throated Martin

Photo : Bhagat Singh



House crow the foster parent of Koel feeding chicks of koel even after they have left the nest

Photo Bhagat Singh

Editorial

"Cheetal has come a long way through its journey starting with its first issue in 1959. This is the 50th issue of Cheetal. The Silver Jubilee of its publication was due to be celebrated 3 years back and so is the case with the Wildlife Preservation Society of India Dehradun which is about four years older. Both deserved grand celebration but the response has somehow remained out of our minds. This was mainly because of poor response of the members in every respect. Even the General Body meetings had poor response all these years. The founders of the Society were far sighted who purchased a space for the Society at a central commercial place in Dehradun, sometime in 1976. Due to poor financial position of the Society the place remained in same condition all through these years. There were attempts to grab the place by vested interests which could be thwarted with great efforts. During last few years publication of Cheetal could be possible with the partial financial support from WWF India.

Rupees two lakhs and fifty thousand donated in her Will by Maharani Sahiba of Nabha came in handy to repair and secure the place after eviction of the encroachment in the back room and backyard premises of the Society. Maharani Sahiba was the Chief Patron of the Society after the demise of H.H.Col. Maharaja Sir Pratap Singh Malvendra Bahadur, K.C.S.I. Maharaja of Nabha who founded and patronized the Society during his lifetime.

The Office of the Society being at a highly commercial place, the danger of encroachment and grabbing always loomed large. In the past few General Body meetings concern was raised by some committed members to sell the place & buy an office at more suitable place & utilize the remaining money in fulfillment of the aims of the Society & intensifying its activities.

With continued efforts of the Executive Committee, the space could be sold at a reasonable price which has been approved by the competent court as per existing law. After the approval by the Honorable court General Body Meeting was held on 29.04.12 in which a Committee was appointed for purchase of the new office premises under the Chairmanship of Dr. Prasant Singh a life member of the Society and member of Executive Committee. We hope to get a good office building for the Society in the near future.

In the GB meeting on 29.04.12 some suggestions have been received from members for stepping up the activities of WPSI and improving the quality of the Society's Journal "Cheetal". Minutes of the meeting are published in this issue for wide circulation among our members. We hope to get some constructive suggestions from our honorable members. The suggestions can be implemented only with active participation of our members. It is earnestly hoped that with concrete suggestions and participation of the members we will be in a position to do some meaningful activities for conservation of wildlife and environment which is of paramount importance for our country.

A.S.Negi

New Address of the Society
Heritage Appartment Flat No. 2 First floor, 18 New Road, Dehra Dun.

Letters to the Editor

Dear Sir,

I hope your readers might find my views relevant to the situation in North India.

I have been involved in the improvement of angling in U.K. for many years and I see numerous similarities between the situation in India and U.K.

After the post WW II austerity period the U.K.'s economy went through dramatic changes: The standard of living improved necessitating massive increases of water abstraction. As industry expanded so did pollution and agricultural production increased beyond wildest dreams.

Perhaps, all too late, it was realised that this advancement was at a cost of significant degradation to rivers and thus angling. Anglers, who are the best guardians of the water environment, complained and eventually politicians were persuaded to address the three main problems:-

General Pollution: Long term use of agricultural fertilisers, weedicides and insecticides led to rivers changing their character and pollution from heavy industrial outlets increased this problem. At the same time rivers were excavated to become more efficient as drainage conduits which destroyed the former natural characteristics.

Abstraction: Water is a finite commodity. You cannot make what you have not got. As population and standard of living increase so do demands on water. Education in conservation of water plays a big part in making resources go further but ultimately we will only have enough water if we re-cycle waste water. Some of the water that passes under Tower Bridge in London has been used up to 4 times. The technology exists but it requires the will and money.

Diverse Pollution: Rivers and the fish stocks in them have developed in their particular aquatic environment over many millennia. To survive and breed many species of river fish require areas where there is loose gravel on the bottom of the river into which they can lay eggs. The eggs sink between the gaps in the gravel where they are safe from predators. The problem is that in England and India man's activities permit massive quantities of silt to enter the river; in England from agricultural operations and in India by de-forestation. Both activities result in the gaps in the life protecting gravel becoming blocked and fish numbers quickly reduce. In U.K. farmers are no longer permitted to simply grow what they want where they want without first looking at the risks involved to the aquatic environment. India needs to exercise much tighter control on de-forestation.

While the above might seem a depressing scenario it is nonetheless possible to reverse the situation. In England there are increasing numbers of occasions where Sea Trout have returned to rivers after a 40 year absence.

As said it requires will and money which I believe India can muster.

Yours hopefully,

Roy Church.

C/o Vijay M.Nath

The Howdah

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Dehra Dun 248001.

The Pigtle, Nowhere Lane,

Great Witchingham, Norwich.

Dear Sir,

I first of all wish to congratulate you and the WPSI team for publishing yet another brilliant issue of Cheetal which was delivered to me a few days back. I've enjoyed all the articles immensely. Sir, in the letters to editor column, I read one very interesting letter by an author. Mr. Prosenjit Das Gupta (his name somehow got omitted in the final print of the journal). I have read his books and his first love was Palamu. It would be really great to get in touch with him if possible, and may be invite him to Palamu once again after all those lovely years he spent visiting this place. So, Sir, if possible, could you please kindly provide me his email ID?

Thank you,

With warm regards,

Prosenjit Das Gupta

Dear Mr. Negi,

I am a Life Member of WPSI and have just received the latest issue of the Cheetal on the occasion of the Platinum Jubilee of the CNP. It is a collectors' item with so many interesting and useful articles, especially that of Dr. Johnsingh and yourself (on the re-location of Jhirna and other villages). In fact a friend and I saw a tiger at Jhirna in January this year.

I have been going to CNP and the neighbouring Kumaons since about 1986, and there were times when I was the only tourist in the Dhikala complex and could stay 7/8 days at the royal

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Writing an epitaph for the mahseer

Dr. A.J.T. JOHNSINGH and A.S. NEGI

One of the fascinating narrations of Jim Corbett in his book "Man eaters of Kumaon" is about his fishing for mahseer in a river which flowed for some 60 km through a beautifully wooded valley teeming with wildlife. When Corbett was fishing, the air was filled with the fragrance of flowers and the spring songs of a multitude of birds. Corbett opined that angling for mahseer in a submontane river in such an atmosphere is a sport fit for kings.

After catching a 50 lb. mahseer, Corbett concluded that he might soon forget the weight of the fish, but the sublime surroundings in which he had caught it will not be forgotten and will draw him back to that beautiful valley as yet unspoiled by the hand of man. His description fit well with the Ramganga valley in the Corbett Tiger Reserve (1,400 sq.km) which is still one of the strong holds of mahseer in India. The Corbett Tiger Reserve has a core area of 520 sq.km. which is managed as a national park, the rest is the buffer zone.

The mahseer is a freshwater fish that can attain a huge size. In the past mahseer of 70-80 kg. have frequently been caught and it has been reported that the fish can grow to weights exceeding 100kg. The only other fresh water fish comparable to mahseer in weight in India is the goonch. (*Bagrus bagarius*) which also thrives in the Ramganga. The mahseer shows more sport for its size than a salmon and therefore, considered the best sportfish in the world. As most mahseer take the bait quite avidly, an erroneous impression has gained ground that they are carnivorous and rapacious. But studies have shown that they are omnivorous and take almost anything – weeds, snails, crabs and live fish. The etymology of "mahseer" suggests that the word could mean a fish with "lion's gameness" "big scaled fish", "large headed fish" and "fish par excellence".

Mahseer inhabit most rivers and reservoirs throughout India, Pakistan, Nepal, Bhutan, Bangladesh, Burma and Sri Lanka, Mahseer experts have recognised six to eight species in India but no detailed information on the present status and distribution of each of these species is available. The mahseer occurring in the Corbett Tiger Reserve is the golden mahseer (*Tor putitora*) which is found in river Ramganga and which weights upto 25 kg. The different species of mahseer inhabit varied habitats ranging from tropical waters where the temperature in summer goes upto 35 degrees Celsius to Sub-Himalayan waters where the winter water temperature drops close to zero degree Celsius. Similarly mahseer are found in streams a few metres above sea level and in streams at altitudes of 2000m.

Although accurate, data on the catches of mahseer for different parts of the country are not available, comparison of figures from a few isolated surveys as well as observations of anglers and biologists indicate that there is a serious decline in the abundance of mahseer. The decline is generally due to a combination of factors such as unchecked and indiscriminate fishing, dynamiting and poisoning which even destroys brood fish and juveniles. Pollution and siltation of rivers and construction of dams have impeded the migration of mahseer which is crucial for spawning.,

Unfortunately mahseer, when compared to other commercial fish are prone to depletion and extinction. One of the prime habitat requirements of mahseer is clean water which is becoming rarer. Mahseer need to reach their favoured spawning grounds which have to be calm with well oxygenated water and a bed of sand or gravel. The journey to these grounds is fraught with risks and dangers. The fecundity of mahseer as compared to the commercially exploited species is very low. For example the Deccan or khudree mahseer (Tor khurdee) has 6000 eggs/kg body weight as compared to 2,61,000 eggs/kg body weight of rohu (*Labeo rohita*) and 1,33,000 eggs/kg body weight of catla (*Catla catla*). The eggs of mahseer are demersal (capable of sinking in the river bed), and, therefore, if there is mud on the bed instead of sand or gravel, they can sink and perish. The hatching period of khurdee mahseer is 60 to 80 hours and of Golden or Himalayan mahseer 80 to 96 hours compared to 18 hours for catla and rohu. Further the semiquiescent stage soon after hatching is three days of catla and rohu and six days for khudree mahseer. All these imply that mahseer is more vulnerable to all forms of decimation, and if it has to survive throughout its range, there is an urgent need to plan and implement conservation measures.

Ramganga river, where Corbett would fish for his dinner, sometime in the early part of this century, has undergone a major change due to the construction of a dam at Kalagarh in the late Sixties and early Seventies. As a result the water in the reservoir now spreads for about 60 sq.kms. in summer and 80 sq.km. soon after the rains in July-August, inundating nearly 16 km. of the river from Kalagarh to Dhikala. The 22 km. stretch of the river from Domunda, where it enters the National Park, to Dhikala, remains what it was a hundred years ago, with abundant wildlife on both the banks. Mahseer fishing in the reserve is permitted in the Ramganga upstream of Domunda, in the Mandal draining the Mandal Valley north of Kanda and in the Kosi upstream of Kumaria. All these fishing sites are in the buffer zone of the Reserve. The most important rivers in the Reserve where mahseer spawn are Ramganga, Mandal and Palain. Spawning occurs largely in August.

We had always wanted to fish in the Mandal and we did so in mid-July 1996. After obtaining permits, we drove from Dehradun to Rathwadab on the bank of the Mandal on the northern periphery of the Reserve accompanied by 72 year old N.S. Negi, who has fished extensively in the Mandal until 20 years ago.

When we reached Rathwadab, cotton-white clouds drifted over the emerald green forests. Paddy was being planted in the terraced fields. Copious lime-white water flowed in the river. All this indicated that the monsoon had set in a few weeks ago. We were tempted to go fishing that warm and sunny afternoon.

Negi took us straight to the confluence of the Kateur and the Mandal where, 20 years ago in July, he had caught several fish each weighing over 10kg. The confluence is about 10km. from Maidaban where the river enters the forest. Houses amid paddy fields were sparse on the banks of both the rivers. Several boys were playing and swimming at the confluence and two of them had improvised fishing equipment. They had not caught any fish that day. They also said that the largest they caught this season weighed two kg. In spite of many attempts, with the best fishing gear available in the market, we could catch only one fish

which weighed 500 gms. We moved further up the river from pool to pool but all were empty. We met one boy, about 14-years old, adept in crossing the river to use his fishing gear. On seeing our disappointment, he said that the depletion of fish was due to dynamiting which was done almost every day from July to September. He added that the poachers did not come that day as they had heard about our coming.

By this time the sun had set, the light was fading fast and the common hawk cuckoo or the brain-fever bird was calling repeatedly. Already the news of dynamiting in a river that flows through a protected area of the country had created an atmosphere of gloom for us which was aggravated by the pining call of the bird. We had been under the illusion that the mahseer in Corbett Tiger Reserve is safe from such Vandalism.

The next morning we drove along the river for 13 km. to fish at the confluence of the Kali and Mandal, far from human habitation. The water in the Mandal was warm, while that of the Kali, which springs out of a deep, well-wooded valley, was cold. Although such spots are ideal fishing sites, the largest fish that we caught weighed just close to two kg. The giant mahseer of yesteryear were totally missing. Suddenly the serenity of the setting was disturbed by the ominous appearance of 10 men who came up the river. We watched them with abated breath. About 200 metres away they dynamited a large deep pool with a formidable rapid. We moved towards them and they slunk away. dead and dying fish drifted along the river.

In the evening, sitting on the lawns on the Rathwadab rest house, we discussed the problem with some village elders and the forest staff. We realised that dynamiting, which kills even small fish, has been going on for the last 10-15 years and surprisingly no one thought it was an inhuman act. One elder talked about abundant fish in the past, between July and September. He said sufficient oil for burning lamps in the valley was obtained by smoking the fish. He concluded that if his generation was well built, healthy and intelligent it was because they ate plenty of fish in their younger days for about three months every year.

The discussions revealed that even other mahseer spawning habitats - Palain and Ramganga – were not safe from dynamitting. In addition, fish in the Ramganga reservoir also suffered heavily due to illegal netting. All this pointed to a bleak future for mahseer in Corbett, the pride of India's protected areas.

We went to bed very late but sleep evaded as for a long time. The vision of the agile boy unsuccessfully trying to fish, the men dynamiting the river and dead fish floating down the river repeatedly came to our minds.

We are involved with a conservation initiative called "Operation Eye of the Tiger." This has been formed to save the tiger, its habitat and allied species. We have decided to use this programme to forge a link between the people and the Forest Department and evolve a conservation programme to protect mahseer when it comes to Mandal valley for spawning.

The plan includes giving water proof clothing to the staff to enable them patrol even during the rains and awards for meritorious service to controlling fish poaching. The women of Mandal valley will be called for a meeting and told of the importance of mahseer in the health and growth of their children. The help of women will be sought to protect the fish from dynamitting. The young boys and men of the valley will be educated about the

evils of dynamitting but will be encouraged to fish with line and casting net. This could be permitted upto Maidaban, 13 km. from Rathwadab. The Forest Department will be requested to encourage more sport fishing, as the presence of sportsmen discourages illegal activities. The problem of poaching in the Ramganga and Palain rivers and in the Ramganga reservoir will be highlighted and controlled, to deter the onset of the bleak future of mahseer in Corbett Tiger Reserve.

All this will have to be done urgently and effectively so that pleantiful mahseer start spawning in the Mandal river. The young boys will have great fun in catching the mahseer and immense satisfaction in adding a valuable item to the family menu.

The Institution of Mahauts

*A.S. Negi IFS (Retd.)

Mahaut is a Urdu word used to denote the person who has abilities and experience of driving a domestic elephant. Elephant is the largest mammal on land and has unusual size, weight and strength. Being intelligent and social in nature it has been possible to tame the animal but handling it and taking work from him is possible only with the help of a trained and experienced person. Domestication of elephants and their use for purposes like army, carrying men and material, adoring processions of Hindu Gods, a status symbol of kings, land lords and Mahants and above all for Shikar (hunting) has been a age old practice. Some Indian kings had armies of elephants numbering few lakhs. The kind of extensive and multipurpose use of domestic elephants was only possible with the help of Mahauts.

There is no record of formal training of Mahauts even where their number was very large like that in Armies of great rulers of ancient age. Mahauts have always been institutions in themselves and they continued the important profession through family tradition and it has remained a ancestral vocation being practiced generation after generation till present day. This was largely a profession of Muslims and remains so even today though on a much smaller scale.

After the ancient armies of rulers, it has been the Forest Department in different Asian countries which has been traditionally using elephants in large numbers initially for salvaging timber and hunting purposes but of late for tourism in forest areas and to a limited extent for inspections of remote areas in plains. There is no record of any formal training or direct recruitment of Mahauts even in the forest department. It remained as a family profession passing form one generation to the other. Till the time when elephants were extensively used for salvaging timber there used to be large number of elephants with forest department in South India and Assam. Breeding of elephants being a slow process their numbers were sustained by catching wild elephants through operations like 'Kheda'. These operations were conducted on a regular basis with the help of domestic elephants and Mahauts with skills in catching and training wild elephants, a tradition that was highly valued and witnessed by large number of urban people and foreigners with special interest.

The requirement of elephant for food and water is large and they could be tamed only by rulers, forest department and Jamidars with large land holdings. In many parts Hindu temples also had domestic elephants. After the disappearance of ruling class and abolition of Zamindari, the number of domestic or tame elephants went down drastically and Mahauts had to take up alternate vocations for subsistence. Next came the ban on hunting and reduction in timber harvesting. Most forest areas also became accessible by road. This further reduced the number of domestic elephants and the institution of Mahauts kept on shrinking.

There was isolated effort in Assam where one Mr. Barua an able professional elephant catcher had a large camp of domestic elephants with Mahauts skilled in catching wild elephants and they together with the specially trained elephants were known as

"Fandis". One of the daughter of Mr. Barua, Ms. Parbati Barua took keen interest in the profession of her father and has kept the tradition alive till date though now no elephant catching operation can be continued which has been banned under Wildlife Protection Act.

Parbati a smart lean and thin woman of short height not weighing more than 40 kg earned appreciation for her skills in India and abroad and now even at her advance age, she can handle elephants with great skill. The forest department specially in Uttarakhand and few other states took her help in training their Mahauts in short course of a week or ten days duration which she conducted with great ability.

The Mahauts of old days had thorough knowledge of elephants. They used to identify the nature, quality and health conditions of domestic elephants. Elephants are very much like humans. Even their anatomy, resembles with us. The placement of their mammary glands between fore legs, location of their sexual organs, shape and size of their eyes, intelligence at birth, social behaviour, sexual maturity of males and females, digestive system etc. have great resemblance with humans. This could be the reason why Hindus worship 'Ganesh' a depiction of half elephant and half human. Elephants are sensitive as far as their health condition goes. The Mahaut has to watch the elephant every day and every moment. He knows that the nails have to be wet, skin smooth and oily, ears flapping. He knows when and why elephants eat soil. What to do after they have eaten soil. During bath they examine their body, pads of all four feet etc. minutely.

Mahaut is the only one who can immediately tell about the general health condition of his elephant. he takes care of his diet. The most important thing is, Mahaut knows how to treat the ailments with 'Nuksas' (tit bits) known only to him. They are very secretive and do not reveal those 'Nuksas' to any one except their own progeny. This is how the knowledge and training used to pass on from generation to generation. The elephants live close to them and the whole family watches the elephant and elephant also recognizes that this is the family of his master. The children of Mahauts, generally in good numbers start approaching elephants from very early age and grown up children will help their father feeding, chaining, bathing, cleaning, grazing and even mounting of 'Hauda' etc. During the process father will keep training them and they become perfect Mahauts by the time they grow. This is how the institution of Mahauts went on and on generation after generation without any formal training whatsoever.

The life of Mahauts has always been very hard and their plight always pitiable. They have never been paid enough to support their large families and their engagement is such that they can't do any other side job. The schedule is so busy that it is not possible for them to look after their children and family. They are so located with their families that it is not possible for them to educate their children. Even in forest department though they are Government Servants but the nature of their duty is so typical that it is not possible for them to look after their families. They are hard pressed for any leisure activity as they are always worried about their animals and can't leave it to any one else, not even to 'Characut' (Fodder man) who is not directly responsible to the animal.

All these difficulties have led to disintegration of their profession by the younger

generation. Now they no more keep their families in the forest or close to where an elephant can be tamed. With reach of electronic media they have also learnt to lead a more comfortable life. Living in towns has brought education to them and after even a token education and living away from elephant they will naturally not like to follow the hard ancestral profession.

The present day Mahauts are not serious about their job. They have not inherited the knowledge from their ancestors and know little about the natural treatment of elephant resulting in their untimely mortality. The veterinary doctors have little knowledge of the diseases of the elephants and even ordinary day to day ailments are referred to them. The veterinarians give them allopathic treatment which does not always suit the animal resulting in complications and consequent death.

Other than forest department the elephants are now domestical by temples and resort owners around high profile protected areas like Corbett. Few people also hire them out to tour operators who conduct elephant safaris in forest areas. The number is very low. Wildlife protection Act has put restrictions like registration of existing animals, ban on sale and purchase etc. which only discourages private individuals to domesticate elephants. Elephant has been declared as a heritage animal by Government of India and an Elephant conservation authority has been mooted on the lines of Tiger Conservation Authority though the amendment in WPA 1972 is yet to be made. The elephant project started in early nineties is continuing with funding and guidelines from MDEF GOI. The funding is still on a small scale to make any dent. The problems of conflict with people is increasing due to shrinking habitat, absence of corridors and connectivities and degradation of their habitat.

With above limitations it is now important for elephant project/elephant conservation authority to seriously take up following:

1. Training of Mahauts not only of the department but also of those engaged with private individuals and organizations. The training has to be started at the earliest with the help of retired or experienced old time Mahauts and forest officers who have experience of handling tame elephants. The services of people like Ms Parbati Baruwa or some veterinary doctors having experience of elephant treatment can be taken. The senior scientists of Wildlife Institute of India, Dehradun engaged in this job can also be available. The training can be imparted in Corbett (Wildlife) training centre at Kalagarh where domestic elephants are available and the habitat around is also suitable. Some other places in South, North East and Central India can also be identified. One such short course of ten days conducted at Kalagarh Training centre in 2001 under the guidance of Ms Parbati Baruwa proved very useful and was appreciated by Mahauts.
2. The upkeep of domestic elephants by private owner has to be standardized by EP/ECA and enforced all over the country.
3. The veterinary care of elephants through trained vets needs to be ensured so that this large size animal worshiped by humans do not suffer due to absence of proper treatment.
4. Forest department being the custodian of largest number of domestic elephants needs

to standardize the upkeep of elephants, training of Mahauts, treatment of their ailments etc.

The Asiatic elephant is fighting for its survival at both the fronts, that is, wild and domestic. Wild elephants are loosing their habitat very fast and domestic elephant is becoming more and more irrelevant in modern times. The fate of the institution of Mahauts is no better and it will be hard to find a Mahaut of by gone days. Domestic elephants are threatened more because they will not be able to find real Mahauts who can care for them and who can give them the real guidance and training for the purpose for which they are now used. This heritage animal of our country can not afford to be neglected at either of the fronts. Revival of the institution of Mahauts is a real challenge with the Elephant Conservation Authority of India. The number of tame elephants is still very large in our country where the scope of use of this animal in ecotourism is still relevant.

Inter-Stream Migration of Ganges River Dolphin in the Kosi River and its tributaries During Monsoon Flood

Dr. Tej Kumar Shrestha*

Abstract

A combination of both underwater and surface observation were used to monitor migratory tendencies of Ganges river dolphin in the Koshi river of Nepal. This river support population of dolphin that migrate upstream during the height of flood during monsoon (June-September). The dolphin follow strictly pre-spawning migration of the fish in June and July and return back to lower reaches of Ganges river with downriver migration of post-spawned migration of fish during October and November. The habitats Koshi river and tributaries used by dolphin throughout monsoon did not change, until flood is withdrawn in November. Relocation to main cradle of the Koshi river occurred during early winter December to February. At this time current velocity of the river decreased with the increasing of transparency. Movements of dolphins in monsoon newly cut braiding channels and stranding incidents in pools and oxbows were recorded for the first time in Nepal. Need and opportunity of rescuing migrating dolphin population in Koshi is highlighted. Suggestions are given for conservation and action.

Introduction

Although there is some information on migratory trend of dolphin reported by number of investigators in past (Kasuya and Haque 1972, Shrestha 1986, Shrestha 2001 and 2002 Wakid 2005) but a detailed and consolidated study of inter-stream migration was lacking. It is therefore considered essential to undertake upriver and down river migration of dolphins in the Koshi river for its conservation and management. Therefore, opportunity is taken to record and describe inter-stream migration of dolphin in the Koshi river.

The Study Area

Koshi river, is one of the magnificent river of Nepal covers 730 km inside Nepal (Fig. 1). It originates from the mountains of Nepal and Tibet. It drains an area of 86,900 sq. km between 85°20' and 88°00'. The Koshi river carries largest sediment load amounting to 7,308 tons per square mile of its catchment, most of which is deposited on the flood plain. The average discharge of the river varies from 1,75,000 cu/sec to 9,25,000 cu/secs. The annual sediment load is well over $283 \times 10^6 \text{ m}^3$. No other river in Nepal has so large a catchment as the Sapta (Seven) Koshi river. This river is formed by the confluence of the Sunkoshi, Arun and Tamur rivers at Tribeni near Mahabharat mountain range. The Koshi Project controls the annual floods. The Koshi river flows

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through a gorge at Chatara, it enters Saharsa district of Bihar (India) from Hanuman nagar, carrying high level of sediment during rainy season. The devastating flood water of the Koshi river bring high silt load which is estimated to be a magnitude of 80,000 to 1,20,000 in Nepal. Maximum Average rainfall near Chatra is 600 mms in June -July. Bulk of rainfall received in 4 months from June to September i.e., an intensity of 100 m/hr for a duration of 15 minutes is quite frequent. (Fig 2) The Koshi river has profuse branching into many interlacing channel due to its oscillating character from aeons of time. The virulent character of Koshi river is comparable to Hawong Ho river of China.

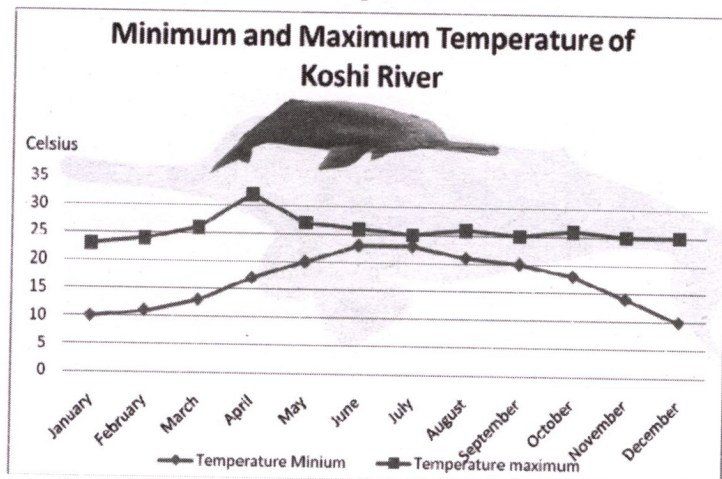


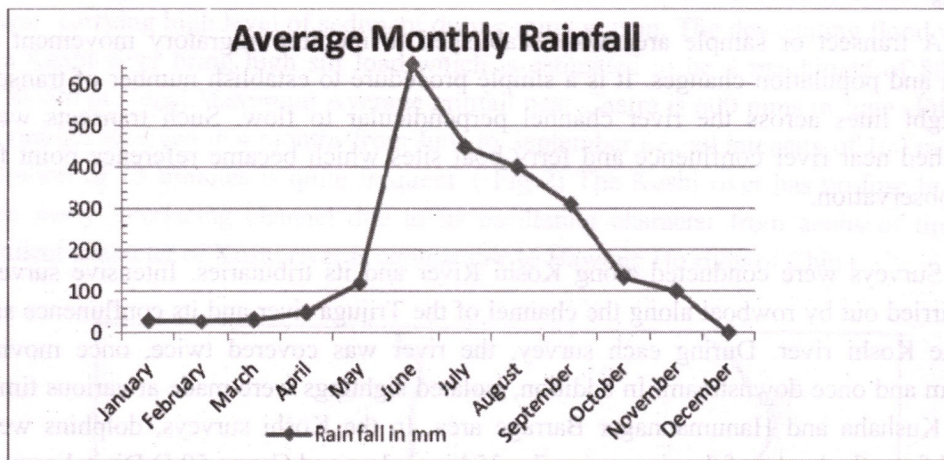
Fig. 1 Showing Koshi river basin

Methods

A transect or sample area was established to monitor migratory movement of dolphin and population changes. It is a simple procedure to establish number of transect of straight lines across the river channel perpendicular to flow. Such transects were established near river confluence and ferry boat sites which became reference point for future observation.

Surveys were conducted along Koshi River and its tributaries. Intensive surveys were carried out by rowboat along the channel of the Trijuga river and its confluence site with the Koshi river. During each survey, the river was covered twice, once moving upstream and once downstream. In addition, isolated sightings were made at various times on the Kushaha and Hanumannagar Barrage area. In the Koshi surveys, dolphins were counted from the banks of the river using 7 x 35 binoculars and Canon 50 D Digital camera with a 100-400 mm telephoto lens. The surveys were made from both banks of the river simultaneously, with three observers on each bank recording surfacing and diving times with a tape recorder and counting the dolphins. When conditions were suitable, a underwater video camera was used to record surface activity; the video examined to confirm counts of surfacing dolphins. Where conditions on the riverbank were dangerous because of the rain and flood observations were made from an elevated cliff. Polaroid sunglasses were used to combat the intense glare on the river at mid-day. Nine survey points were used; all were covered in a single day, during daylight hours. Between 30 and 60 minutes were spent at each survey point. The dolphins were counted only after considerable time had been spent observing size, shape, colour and natural marks of the individual animals, to avoid counting the same individuals. A theodolite was used to measure width of the river, dimensions of pools, etc.





4

Fig 2. Minimum and Maximum Temperature of Koshi River and Average Monthly Rainfall

During the surveys attempt were made for collection of authentic reports from the people living near the river. Besides these local wildlife officials were interviewed and asked for information about sightings of dolphins. They were shown photographs of the Susu to avoid confusion with various large fishes and crocodiles that inhabit the river. The reports by these casual observers must be treated with some caution. Besides these accidentally killed stranded dolphins were dissected their gut were opened to study internal organ and examining semi-digested food item other biological parameters.

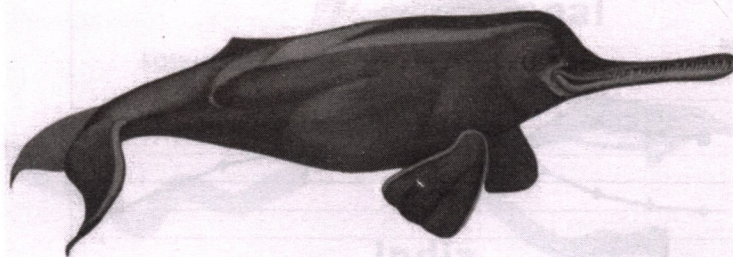


Table 1

Biological Parameters of Ganges River Dolphin

1. Head comparatively small with long prominent snout
2. Tip of beak is moderately thickened
3. Mouth line curved upward
4. Beak long beset with with 27-32 sharp pointed teeth(in upper and lower jaw)
5. Paddle spatulate
6. Hump vestigial or degenerate
7. Tail-fluke broad wide
8. Cervical vertebrae 5
9. Sexual maturity reach at length of 170 to 200 cm
10. Male grow 2 to 2.1m
11. Female grow 2.5m largest female weigh 80 kg
12. Daily food consumption 100 140 kg
13. At birth young measure 70 to 75 cm.
14. Upriver migration are triggered to monsoon rain and abrupt rise of water level in June-July. They leave for principal river searching clear water tributaries. High turbidity, high current and wash down of boulders and logs compel dolphin to migrate from main river to feeder stream.
15. Down river migration of Susu to original river channel is triggered by receding water in feeder steam, down river migration of post spawned fish
16. Susu enjoy communal fishing in river confluence sites with cormorant, fishing eagle, otters, white heron, stork and other water birds
17. Live associating with turtles *Chitra indica*, *Hardella thurgi* and *Aspidoretes punctatus*.
18. Swimming pattern usually tilted, enjoy side swimming mostly modding continuously
19. Echolocation, biosonar mechanism in Susu is sophisticated
20. Hunt in school of 1-5 individual round the fish prey to shallow water
21. Social life is unique not duplicated by other aquatic animal of the river. The young dolphin is extremely playful, display birth marks, they are often surrounded by mother and nursing mother often encircled by them with great love.

General Background of Information

Aristotle first classified dolphins. They graced the art of ancient Greece and Rome. Small, sleek and streamlined, with a long back river dolphins are active in swimmers, often leaping in and out of the water, splashing, pounding on the water with their chins or flukes or zigzagging just below the surface. Exceptionally curious, they often swim-alongside the fisherman towing the boat, sometimes rolling on their side to look up humans in a curious motif. Gangetic dolphins presently exist in most waterfronts of the Nepal, India, Bangladesh.

The Gangetic dolphin (*Platanista gangetica*) belong to order Cetacea. It is the largest fresh water mammals found in Nepal. It is considered as endangered species (Appendix I IUCN). Originally targets of fishermen, they are now victims of dams, pollution and habitat degradation and above all, toxic contaminants from the fields that destroy the dolphin's food. People are now more aware about these gentle creatures and the need to protect their habitat by establishing safe havens for them.

Migration is most spectacular phenomenon in the animal world. It has intrigued mankind from centuries. Fish, bird, butterfly and many other animals leave their ancestral home temporally for better condition of life for feeding and breeding. The phenomena of migration is therefore looked upon as periodic passing over of animals from one place to other for to adjust changing condition life, the phenomena is annual and often it implies double return. Migration often implies homing back or return to original place. Here, we will be concerned feeding migration of dolphin and breeding migration of fish into Koshi river.

Results of Monsoonal Migration of Dolphins

Monsoonal study on the migration Ganges river dolphin continued from June 2009 to November 2011 in Koshi river of eastern Nepal. We were driven from the border town of Hanumanagar to Barahachetra and to every accessible point for observing migration. If necessary we walked to river bank to reach confluence sites of river and stream to watch fish swarming and incidents dolphin migration. When necessary we took a canoe to reach small tributary Koshi such as Trjuga and other unnamed small rivers, Here we saw fast moving tight school 7 to 15 dolphins hunting fish and making spectacular high jumps in flooded water enjoying great banquet of fish and festivity. The migrating school seen in tight cohesive groups, composed of adult males, females and some immature sub-adults. We heard sounds of high frequency sometimes glee full clicks made by the migrating dolphins for the first time.

Summary of Dolphin Survey in the Floodplain of Koshi during Peak Period of Monsoon Flood (August 15 to September 18, 2011)

River Section Surveyed	River Ecology	Habitat Description	Dolphin Sighted
Koshi at Barahachettr at the confluence site of Kokaha river	The river bank is steep undisturbed. The bed load consists of boulders, pebbles and shingles. The river swollen with turbid water about 200 m wide and 30-50m deep. Here 3-5 dolphins are seen in the waterfronts of Koshi river near temple of lord Baraha. From this spot Koshi river debouches to Terai plains	Shoreline is stable with rocky and sandy bottom. Mostly banks are boulder strewn. The pH of water varies from 6 to 9 and current velocity 3 to 5 m/sec. Fish swarming takes places near so-called Saraswati rivulet and Koshi confluence. Dolphins were seen rounding their fish catch along shallow bank.	3
Koshi river at Chatra near Chatra Irrigation canal	River is deep creates countless channels and oxbows making summer resort for dolphin. River 200 to 300 m wide channels are seen there.	River bank is unstable, exposed, bottom is covered with pebbles and fine sands. Dolphins are seen hunting and fishing motif occasionally entering in backwater of pools created by boulders. Many gill net and drift net fishermen capture ripe fish with running eggs. Most fishes seen moving towards clear water oxygenated tributaries of river to avoid oxygen deficient condition of flood	8
Koshi river near confluence site of Trijuga river	Floodplain of the river is wide, bottom is sandy. It is about 300 to 400 m wide in flooded condition. here Koshi river carve out numerous criss-crossing channels	River bank is unstable habitat is much disturbed water is turbid half solid, half liquid. Drifting material consists of logs, wood, rhizomes, rooted vegetation. About 5 to 12 dolphins are regularly seen. Many gill net and drift net fisherman seen catching spawners. The Trijuga river bankful with water and thick moat of spawners.	9
Koshi at Hanumannagar far below Koshi Barrage	Koshi river is highly disturbed by fishing activity. The width and depth varies 200-400 m and 10-20 m. River is broken into number of sister channel. Many fisherman seen plying their boat, drift wood collectors are seen collecting uprooted trees, tree trunks, branches for fire-wood. Occasionally wildlife such as deers, wild buffalo, boars are seen washed away by flood situation in the river cataclysmic.	River bank is sandy and muddy. River water contains a lot of organic material rotten, leaves, debris that suffocates fish and impair their respiration. Fish kills were observed along river banks. Occasionally dolphin calves are seen stranded and lying helpless. The river is not navigable by boat due to strong eddies current, high crest and ripples. Dolphin rescue operation is dangerous not fruitful at all.	8
Total dolphins sighted			28

Episode of Dolphin Migration

Each year during monsoon period June to August, the major river system such as Koshi swells with flood water and overflows its banks threatening survival of Ganges river dolphin and fishes. During such period fishes become sexually ripe and begin spawning migration towards head water feeder streams such as Trijuga to breed. They deposit their ripe egg in gravel beds of the stream. As fishes as principal food of dolphins they to follow the fish migrating head water streams of the Koshi river and Trijuga and Kokaha etc. Therefore confluence sites of Koshi river and streams is looked upon as resting refugia and nursery ground of dolphin and fishes in monsoon.

To fulfill migratory errands twelve dolphins moved towards Trijuga a tributary of the Koshi river following strictly spawning migration of mahseer (*Tor tor*, *T. putitora*) and other catfishes fishes in first week of July. They strictly followed magnitude and direction thick school of fish in September known as mahseers, minnows and other small cyprinid fishes. Local people termed this as Pith or fish-follow migration. Migrating fishes showed up their back while moving anti-current towards confluence sites of upper reaches of Koshi to reach finally Trijuga river confluence site. Sometimes they took gulp of air exposing their nostril at water surface. School of the dolphin also followed closely fish migration. They too showed up their hump or back as well as long probing snout and exposed their blow hole frequently at the water surface for breathing at interval of 15-45 sec. During the end of August dolphin stayed almost all time in the high flood period stayed near confluence site of Trijuga river and its feeder streams preying upon varying species of fish and sizes. Most of time dolphin enjoyed communal fishing at the shallows of feeder stream or tributaries called Vangaloos. This time migration fish mass was stable, remained concentrated in deep pool of the Koshi river, they spent much time hunting, chasing the fish.

Our study showed that the female dolphins give birth of young by April and May coinciding first rains. As soon as pre-monsoon rain started in May and water become, and breeding ichthyomass get dispersed and dolphin migrates towards feeder streams. Dolphin with their calves also migrates upriver they engaged themselves in hunting and chasing diverse species of breeding fishes there and around.

Fish and Dolphin Aggregation Spawning Den

At confluence where one river is fast and the other is either much smaller or of much slower flow, an eddy will form. The swirling water of the eddy will carve out a depression often quite deep, which is much to the liking of river fish and dolphin. During time of heavy flooding, one can expect to find most spawning fish and dolphins migrating into Secondary river or tributary where the flow is moderate female spawning fish deposit egg and get fertilized by males sperm. Such retreats of spawning den of fish often frequented or hold by dolphins and other fish eating animals. At confluence site of Trijuga and Koshi we found school of dolphins joining migratory fishes we saw merry dolphins at play. Touching muzzle to muzzle, in what best could be described as a kiss. We witnessed their frisking and frolicking habit in slow motion looked very much like a

ballet. We spotted 7 dolphins making great somersaults or high jumps to socialize with their kens and other migrants following them.

Dolphins are not permanent denizens of any particular area. They exhibit a typical seasonal migration between river systems. During the course of our study extending from 2009 to 2011 revealed that they were best seen in October up to January in the main cradle of Koshi river near Hanumanagar. With onset of monsoon (May/June) the dolphins started moving out from the main cradle of Koshi to its feeder streams and side branches such as Trijuga and other small unnamed streams. They covered a distance of 10 to 28 kms of the study area each day. They remained in pre-monsoon (May-June) and post-monsoon (September-October) in Trijuga river. They could be spotted in river Trijuga and Koshi confluences along the great eddies, where water clear and oxygenated. As rainy season is over these rivers gradually dry up spawning of fish ceases and move downstream in October and dolphin make downstream migration and begin to reappear in downstream original channel of main Koshi river. In Koshi river there are 28 resident population of dolphins and variable population migratory ones from 9-15. With onset of monsoon (May/June) the migratory dolphins start moving out from the main cradle of Koshi river from lower reaches of Ganges river of India and enter Nepal as soon as flood gate Koshi Barrage opens. Our research reveals that peculiar smell of monsoon water, high current charged with rich ions salts raising water level provides rheotactic stimulus to dolphin and fishes for migration

Dolphin Stranding

In the Koshi Tappu region where river major carps, eels upstream with predatory dolphins. Also in the pool areas of Trijuga, bulk of fish migration takes place. Some dolphins happen to be stranded in canals and oxbow lakes. Major carps and catfishes school also undergo seasonal migration. Downstream of Koshi river is blocked by a barrage and at this spot dolphin wait for opening of flood gate during monsoon. Since the construction of Koshi barrage in Nepal- India border ecological balance of the area is changed by flood regime in the Koshi river, causing degradation of land (Sinha 2009). In 18 August 2008 greatest avulsion took place in Koshi river draining part of in Nepal and North Bihar. In Nepal side Koshi river shifted by 120 km eastward, triggered by the breach of eastern afflux bund at Kusaha in Nepal at location 12 km upstream of Koshi barrage. Large area inundated after the event of avulsion stranding and killing many dolphins and wildlife including wild buffalo and crocodiles. During this event three dolphin were rescued by military personnel set free at safer side of the river other seven dolphin stranded in shallow water due to loss echolocation power in highly turbid food water and killed by fishermen at night for medicinal oil. Similarly, expansion of irrigated agriculture adds considerable load of pollution and due to use of pesticides and herbicide in the water bodies. It has been detrimental healthy growth of fish community and sustenance of top predator as Gangetic dolphin.

Because of high turbidity of water; the behavior of dolphins below the water surface was not clearly observable at this time. Water level of the Koshi and Trijuga river

system decrease from October to April at this time most dolphins and their fish prey will be found in critical condition. But rainy season of monsoon (June - September) dolphin arrive with spawning run of fishes. Dolphins enjoy feeding spree. During low phase of the river (November-January) increasing drift net fishing, intensity of Current net fisherman and decreasing fishes biomass drive dolphin to shallow pools where they are caught as by catch in fisherman net.

In the high water phase of June school of catfishes such as Suhjana (*Aorichthys seenghala*), rohu (*Labeo angara*), minnow (*Salmostoma bacaila*), jalkapoor (*Clupisoma garua*) can be seen migrating in pools. As this event take place in high flood period of monsoon, fishes were safe to deposit spawn only along shallow water river banks. Many fish eating predators including dolphins gather for hunting and chasing fish eg Indian river tern (*Sterna aurantia*), Large cormorant (*Phalacrocorax carbo*), Darter (*Anhinga rufa*), otter (*Lutra lutra*) and turtles (*Aspideretes gangeticus*) be seen enjoying feast of fishes. The fishing activity of these animals is delightful to watch each year.

To find out real cause of dolphin stranding need further study. It appears that cessation of rain cause withdrawal of water mass and reduction water level which induce formation of disconnected pools and oxbows near confluence site of Koshi and Trijuga rivers. Hunting and fish chasing dolphins enter such disconnected pool and oxbows of meandering channel of Koshi and Trijuga river. Therefore, receding low water level appears to be main cause of stranding of dolphins. During dolphin stranding period in November water surface temperature of main Trijua and Koshii river fluctuated from 22 to 28 °C. Current velocity in the Koshi river was 0.25 to 1.5 m/sec, pH of water fluctuated between 6.5 to 8.5. At this time gill net an drift net fishermen take advantage capturing stranded dolphin and big sized game fishes. During November dissolved oxygen reached almost 7- 10 ppm. In shallow water of stranding pools few large fish are available for food ,here dolphin preyed upon fish 15-25 cm length group such as jalkapoor (*Clupisoma garua*), gobid fish (*Glossogobius giuris*), baril (*Barilius bola*). The young or calf dolphin foraged on small fishes preferably *Chanda nama* and *Pseudambasis bacculis*, *Aspiroparia morar* etc.

Discussion

Although made extensive study on distribution of dolphin in rivers, little is said about inter-stream migration of dolphin population. Present study reveal for the first time synchronization of upriver migratory cycle of dolphin with flood cycle of river and mobile breeding fish population in the main river and tributaries. Further, Koshi river snow fed and rain fed water coupled with murky run off in monsoon impart peculiar river odor that provide gustatory impulse to fish and dolphin for upriver migration.

Several environmental factors appear to be responsible for onset of headwater or upriver migration of river dolphins (Shrestha 2002). The sudden changes of water quality,

water level, discharge and temperature are identified to be responsible for triggering migration.

The present author observed a positive correlation between the number of downstream migrating dolphin and decreasing water temperature during the period of stable discharge. Ganges river dolphin exhibit significant habitat shift through their lives. The breeding areas are mostly found in deep pool of large river. After the young is born in May and June river water quality changes due to seasonal rain so also temperature and current velocity. Dolphins begin upriver migration towards Trijuga river tributary in search of better fish food and nursery for growing young's. Although feeding condition improves considerably in the new environment of upriver tributaries and river confluences, but the change of the habitat is probably the most critical during their life cycle.

What can be done to ensure that dolphins survive? Obviously hunting, trapping of the animal must be stopped and although laws forbid trapping, this fact alone not seen enough in the past and is not likely to succeed in future. Therefore, much stress be put for control and enforcement of laws, as well as higher penalties for offenders appears only answer. With this hope, our great effort is to portray the cycle of the migratory Gangetic dolphin in a new light, focusing on the intricate relationship between school members and their monsoonal migration activities throughout Koshi river of Nepal. We hope to educate enlighten dolphin lover about wonderful social life and migratory behavior of *Platanista gangetica*, beginning with this first point in the Koshi River that voices concern.

Conclusion

1. To our knowledge, this is the first time monsoonal inter-stream migration of the Gangetic dolphin is elucidated in such a fine temporal and spatial scale.
2. Between June and August, as individual dolphin migrated from main river Koshi to upriver section of Trijuga river and its tributaries following migration of their fish prey. Most of their time in monsoon period is spent in confluence site of Koshi and Trijuga rivers.
3. During August-September when water level was high and stable they remained in putative feeding ground or nursery areas of Trijuga river and small tributaries hunting and fishing and rearing their young babies or calves there.
4. These results increase our understanding of process that underpin dispersal and contributes to development of more biologically realistic dolphin conservation and fishery management models.
5. Data also suggest that dolphins and school of spawning fish enter brisk spawning period during peak monsoon but after the subsidence of monsoon flood and lowering

of water table and temperature in tributary rivers, they are forced to exhibit down river migration for rest and recovery.

The author demonstrates clearly that migrating population of the dolphin show distinct specific behavior patterns that persist at seasonal scale and are directly related to the change of odor of river water during monsoon, water level, velocity and direction of migration of spawning school of the fishes

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Conservation Strategies for Some Lesser Known Medicinal Plants of Uttarakhand

G.R. Gargya

Abstract

Medicinal plants play a significant role in curing various ailments from times immemorial. Many medicinal plants despite their medicinal potential remain inconspicuous. Hindus worship plants in the form of various gods, goddesses and minor deities as part of their religion including some widely used plants. The indigenous knowledge of herbal medicine is gradually disappearing due to lack of written documents and maintenance of proper literatures. Over the past few years, however, the medicinal plants have regained a wide recognition and majority of people in developing countries, and to some extent in developed countries, are using plants for medicinal purposes and this tendency is on the increase especially in the industrialized countries because of either emerging concept of over medication/side effects or ever increasing cost of health care delivering systems.

Key words: Ayurvedic, lesser-known medicinal plants, indigenous knowledge, *in-situ* conservation, bio-resources

Introduction

The North-Western region of India has a great diversity of medicinal plants because of the majestic Himalayan range. The traditional Indian medicine system 'Ayurveda' has its roots in the Himalayas and heavily depends on the pharmaceutical properties of indigenous mountain herbs. Since the beginning of civilization, people have used the indigenous plants as medicine using traditional methods for healing and curing of various diseases. Tribal and rural communities are using the herbal native medicines to a large extent for the treatment of common ailments like cold and cough, fever, headache, body-ache, constipation, dysentery, burns, cuts and scalds, boils and ulcers, skin diseases and respiratory troubles etc. (Gargya, 2011). At present large number of useful drugs are derived from the plant sources, which are potentially used the curing of a number of diseases. Report of WHO showed that about 80% of population in the developing countries depends on medicinal plants for primary health care needs (Ann., 2003). Although various plant species have the medicinal properties and are being used in the treatment of many diseases but large numbers of lesser known plants also have great medicinal potential in the Himalayas and are being used by the local communities for curing of different ailments. In India, many drug manufacturers are extracting drugs from the usable parts of well-known and popular medicinal plants from nature. Many herb and shrub species are well-known for medicinal value for their underground parts (root, rhizomes, tubers, bulbs etc.) and after uprooting these plants have no chance to regenerate again and gradually their populations have become threatened. Furthermore, the indigenous knowledge on the use of lesser-known medicinal plants is also rapidly declining (Kala, 2005). Realization of the continuous erosion of traditional knowledge of many valuable medicinal plants and current status of their long term survival

calls for serious efforts and concrete policy approach for conservation of these natural medicinal plants and formulate *in-situ* conservation strategy for these valuable species.

Importance of lesser known medicinal plants

Many of the plants in Himalayas are less known for their medicinal potential and are being used by rural people for curing of various kinds of ailments. Apart from the human use, many species are also traditionally used in health care of domestic animals. Many communities in Hindu religion worship the plants in the form of various gods, goddesses and minor deities indicating the importance of conservation of these plants. It will be of utmost importance to do further studies of the lesser known medicinal plants so that they can replace the better known plants which are endangered or threatened. Some of the lesser-known medicinal plants are listed below:

Botanical name	Local/ common name	Family	Habitat	Parts	Uses
<i>Achyranthes aspera</i>	Latjira	Amaranthaceae	Under shrub	Whole Plant	Useful in respiratory problems and influenza. Extract is used in dissolving the kidney and gall bladder stone
<i>Aesculus indica</i>	Pangar	Sapindaceae	Tree	Seed, seed oil	Astringent, acrid and narcotic properties and used in skin diseases and rheumatism
<i>Ageratum conyzoides</i>	Basya	Asteraceae	Herb	Whole plant	It is colic with flatulence and used in diarrhoea, dysentery and other gastrointestinal ailments
<i>Albizia lebbeck</i>	Siris	Mimosaceae	Tree	Leaf, seed	Leaves are used in night blindness; seeds are considered in hypoglycemic and anti-cancerous and used as astringent and tonic
<i>Alnus nitida</i>	Utis	Betulaceae	Tree	Bark	Decoction is applied externally for body swelling and pain
<i>Argemone maxicana</i>	Brahma dundi	Papaveraceae	Herb	Leaf, seed oil	Leaf juice is used in blister, excoriations and indolent ulcers; oil is applied in skin diseases
<i>Bidense bipinata</i>	Kummar	Asteraceae	Herb	Whole plant	It is used for snakebite and has the antimalarial and antitumor properties
<i>Bombax ceiba</i>	Semal	Bombacaceae	Tree	Gum, root	Gum is aphrodisiac, astringent, demulcent, hemoptysis of pulmonary tuberculosis; and root is stimulant and tonic
<i>Callicarpa macrophylla</i>	Dahia	Verbenaceae	Shrub	Leaf, seed	Leaves are used in rheumatism; seed paste is applied in stomatitis and leprosy

<i>Cannabis sativa</i>	Bhang	Cannabinaceae	Shrub	Leaf, Seed	It is useful in neuralgia, gout, rheumatism, insanity, infantile convulsions, insomnia etc.
<i>Carissa spinarum</i>	Karaunda	Apocynaceae	Shrub	Root	A strong purgative
<i>Cassia fistula</i>	Amaltas	Caesalpiniaceae	Tree	Fruit	Fruit is purgative and laxative for habitual constipation
<i>Cassia tora</i>	Chakunda	Caesalpiniaceae	Herb	Leaf, seed	Leaves are used in eczema and skin diseases; seeds are applied in leprosy and psoriasis
<i>Cedrus deodara</i>	Deodara	Coniferae	Tree	Heartwood, wood oil, bark	Wood is carminative, diaphoretic, diuretic and expectorant; wood oil is used in phthisis, bronchitis, blennorrhagia and skin eruption and diseases; bark is astringent
<i>Celtis australis</i>	Kharik	Urticaceae	Tree	Fruit, bark	Fruits are amenorrhea and colic; paste of bark is applied in physical injuries
<i>Cissampelos pariera</i>	Parhi/Harjori	Menispermaceae	Herb	Climber	It has mild tonic, diuretic, stomachic, antilithic, alterative and astringent properties
<i>Coriaria nepalensis</i>	Masuri	Coriariaceae	Shrub	Essential oil	Oil has antimicrobial properties
<i>Cornus capitata</i>	Bhamora	Cornaceae	Shrub	Bark	Bark is astringent and good source of tannin
<i>Cynodon dactylon</i>	Dhoob	Poaceae	Grass	Root	It is diuretic in dropsy and used in hysteria, epilepsy and insanity
<i>Dalbergia sissoo</i>	Shisham	Caesalpiniaceae	Tree	Bark	Bark has abortifacient, anthelmintic, antipyretic, aphrodisiac, expectorant and refrigerant properties
<i>Dendrocalamus strictus</i>	Bans	Poaceae	Grass	Bud, leaf	Young buds are commonly used as food; decoction of leaves and nodes and siliceous matter is used as traditional medicine
<i>Dodonea viscosa</i>	Dodonea	Sapindaceae	Shrub	Leaf	Leaves are used in the treatment of wounds and cuts
<i>Eucalyptus globulus</i>	Safeda	Myrtaceae	Tree	Leaf	Soft leaves boiled with tea and give to patient will be useful in cold and cough and fever
<i>Ehretia laevis</i>	Charmor	Boraginaceae	Tree	Leaf, bark, root	Leaves paste is applied for externally in eczema; bark is used in diphtheria; and root decoction applied for syphilis

<i>Eupatorium odoratum</i>	Kala binda	Asteraceae	Herb	Leaf	Fresh juice is given in gonorrhoea
<i>Euphorbia royleana</i>	Sula	Euphorbiaceae	Shrub	Milky latex	Latex is applied for fire burns
<i>Ficus bengalensis</i>	Bar	Moraceae	Tree	Leaf	Soft leaves tied with hitting part of body gives relief in pain. Used of 5-7 drops of latex with Batasha (a kind of sweet) is give to children will help in speaking
<i>Ficus racemosus</i>	Gular	Moraceae	Tree	Fruit	Paste of fruits is mixed with sugar candy and makes tablets. Use of one tablet daily with cold water is relief in dermal edema
<i>Ficus religiosa</i>	Pipal	Moraceae	Tree	Aerial parts	It has the astringent, antidiarrheal, anti-dysenteric, laxative, anti-asthmatic and antifungal properties
<i>Fragaria indica</i>	Bankaphal	Rosaceae	Herb	Whole plant	It has anticoagulant, antiseptic, depurative and febrifuge properties and used in many diseases
<i>Juglans regia</i>	Akharot	Juglandaceae	Tree	Bark	Bark paste is applied in skin diseases and toothache
<i>Lantana camara</i>	Lantana	Verbenaceae	Shrub	Aerial parts	It has the antiseptic, antispasmodic, carminative and diaphoretic properties
<i>Leucaena leucocephala</i>	Su-babool	Mimosaceae	Tree	Bark	Bark is eaten in internal pain and powder of dried bark is worm repellent
<i>Leucas cephalote</i>	Dronpushpi	Lamiaceae	Herb	Whole Plant	Leaves juice is used for skin diseases. Plant is mild stimulant and diaphoretic and used in fever and cough. It is the valuable drug for snake bite
<i>Lyonia ovalifolia</i>	Ayyar	Ericaceae	Tree	Leaf	Young leaves and buds are toxic in nature and have the insecticidal properties and used in skin diseases
<i>Mallotus philippinensis</i>	Riuna	Euphorbiaceae	Tree	Leaf, fruit	Leaf is bitter, cooling and appetizer; fruit is considered as anthelmintic, pungent, purgative, vulnerary, carminative and alexiteric
<i>Morus alba</i>	Sahatoot	Moraceae	Tree	Fruit, bark	Fruit is refrigerant and used in sore throat, dyspepsia and melancholia; bark is purgative and vermifuge
<i>Musa paradisiaca</i>	Kela	Musaceaea	Herb	Fruit	Separate the peels and pulp mixed with the juice of Awanla (<i>Emblica officinalis</i>) and honey is useful to women in leucorrhoea

<i>Myrica esculenta</i>	Kaphal	Myricaceae	Tree	Bark, fruit	Bark and fruit are astringent, stimulant, carminative and tonic properties
<i>Ougenia oojensis</i>	Sadan	Papilionaceae	Tree	Bark	Bark is febrifuge and gum is used in diarrhoea and dysentery
<i>Oxalis occidentalis</i>	Khathi-buti	Oxalidaceae	Herb	Whole plant	Used in dyspepsia, piles and anemia
<i>Phoenix sylvestris</i>	Khazoor	Palmaceae	Shrub	Fruit, root	Fruit used as tonic and juice from stem is used for cooling and beverages; roots are used in toothache and nervous debility
<i>Pinus roxburghii</i>	Kulain/Chir	Pinaceae	Tree	Oleo-resin	It is stimulant, stomachic and diuretic
<i>Pinus wallichiana</i>	Kail	Pinaceae	Tree	Resin	Resin from young sapling is used as lotion for healing of the cuts and wounds
<i>Prinsepia utilis</i>	Bhekal	Rosaceae	Shrub	Seed oil	Taken internally as tonic and useful in general debility and rheumatism
<i>Prunus armeniaca</i>	Chullu	Rosaceae	Tree	Fruit	Fruit is demulcent, laxative, refrigerant, cathartic and tonic
<i>Pyracantha crenulata</i>	Ghingaru		Shrub	Fruit	Used as cardio tonic, coronary vasodilator and hypertensive
<i>Pyrus phasia</i>	Mehal	Rosaceae	Tree	Fruit	Juice of fruit is astringent
<i>Quercus incana</i>	Banj	Cupuliferae	Tree	Seed	Seeds are astringent and diuretic and used in the treatment of gonorrhea, indigestion, diarrhoea and asthma
<i>Raphanus sativus</i>	Muli	Brassicaceae	Herb	Root	Traditionally juice of fresh radish is given to patient with blank stomach is useful in hemorrhoids
<i>Rhus cotinus</i>	Ban tungla	Anacardiaceae	Shrub	Wood	Wood is cholagogue, febrifuge and used for eye ailments
<i>Rubus ellipticus</i>	Hisul/Hissar	Roaceae	Shrub	Root	Plant is astringent and febrifuge. Juice of root is used in the treatment of fever, gastric troubles, diarrhoea, dysentery and paste is applied externally to wounds
<i>Rumex nepalensis</i>	Bhirmora		Herb	Leaf	Used in colic complaints
<i>Sapindus mukurossii</i>	Ritha	Sapindaceae	Tree	Fruit	Used in eczema, chronic itching and psoriasis
<i>Sapium insigne</i>	Khinna	Euphorbiaceae	Tree	Milky sap	Stop hair falling in the case of alopecia

<i>Stellaria media</i>	Badyalu/chic kweed	Caryophyllaceae	Herb	Whole Bark Whole plant	Paste of leaves is used as ointment for skin irritations
<i>Symplocos crataegoides</i>	Lodh	Styraceae	Shrub	Flower, bark	Bark is cooling, aperient and mildly astringent
<i>Verbascum thepsus</i>	Bhamaku	Scrophlariaceae	Herb		It has expectorant, anti-inflammatory, antibiotic, astringent and demulcent properties and used for lung and skin diseases
<i>Woodfordia fruticosa</i>	Dhaula	Lythraceae	Shrub		Flower and bark is acrid, alexiteric, anthelmintic, cooling, sedative and tonic, which is used in thirst, dysentery, leprosy and the blood diseases

Challenges

The population explosion is a great challenge to the developing countries. Further increasing demand of natural resources for food and medicines and other bonafide needs has led to tremendous pressure on forest and forest based resources, which is leading to continuous depletion of these resources. The continuous exploitation of several medicinal plant species from the wild and substantial loss of their habitats during last few decades have resulted in population decline of many high value medicinal plant species. It is estimated that about 4,000 to 10,000 species of medicinal plants face potential local, national, regional or global extinction, with subsequent serious consequences for livelihoods, economies and health care systems (Dhyani *et.al.* 2005). Several factors are responsible for depleting the population of valuable medicinal plant species, such as uncontrolled increase in human population causing anthropogenic pressures on natural resources, tourist activities in high altitude areas, natural calamities such as earthquakes, heavy snow fall, rainfall, landslides etc., and climate change resulting in increasing temperature and loss degradation and fragmentation of habitats. Lack of concrete policy approaches and indifference of Government agencies is also responsible for declining of medicinal plants. Time has now come to take serious and effective measures required meeting the challenges to conserve these useful bio-resources.

Need for popularization of lesser known medicinal plants

Trust of people in the herbal medicines is increasing day-by-day at the national and global

level. On the one hand dependencies of herbal products are increasing on pharmaceutical industry and on the other hand knowledge of indigenous system of treatment through herbs is disappearing or becoming thing of the past. Only few people in the rural areas now have the traditional knowledge of local herbs, which is neither passed on to next generation by them due to superstitions nor there any documentation available. Medical practitioners and herbal industries prefer only few highly valuable and well-known species, while lesser-known medicinal plants remain neglected. It would be important for the Government and Non-Government Organizations to take initiatives to popularize these species and promote their sustainable use.

Conservation strategy

In Uttarakhand more than 85% land of total geographical area is mountainous and hilly and about 70% of population depends on agriculture for their livelihood. The authentic documentation on farming of medicinal plants in the hilly areas is not available, however most of the traditional remedies depended heavily on natural based herbs and resources. The agro practices of medicinal plants are available for less than 10% and agro-technology is available only for 1% of the total known plants globally (Kala, 2004). Due to increase in human population during last few decades the burden on natural resources has also increased resulting endangerment of many of the forest flora including precious medicinal plants. Many of the lesser-known medicinal plants are being used by local communities as substitutes but they have not been documented or studied in greater details. The nomadic and transhumance communities depending on their cattle for livelihood and regularly working in remote areas both on high altitudes and down below in Tarai and Bhabar forests and living there for long periods with large herds of cattle impose real threat to all medicinal herbs and shrubs. Immediate policy intervention by State Government is required. The *in-situ* conservation of these species is an urgent need to save and multiply these valuable resources in their natural habitat. Herb collectors can be educated and guided properly about the endangered and rare species so that their regeneration is not adversely affected. Measures should be explored for conservation and development through domestication of some of the rare and important medicinal plants. Farmers can be encouraged for 'health

care farming' and they can cultivate the medicinal plants in their own lands instead of exploiting from forest. This will reduce pressure on forest and employment can also be generated for local people. Focusing on lesser known medicinal plants will also save the popular medicinal plants from extinction.

Summary

Ayurvedic era is coming back and people's dependency on herbal medicines has increased during last few years. Traditional system of treatment is not only authentic but it has no side effects. Increasing demand of herbal medicines in the national and global market is an urgent need for commercial cultivation of medicinal plants. The success of medicinal plants sector depends on the awareness and interest of the farmers as well as other stakeholders besides supportive government policies, availability of assured markets, profitable price levels, and access to simple and appropriate agro-techniques. The successful establishments of medicinal plants sector may help in raising rural employment, boost commerce around the world, and contribute to the health care of millions of people. In India farming of medicinal plants is low due to difficulty in marketing and exploitation by middle men. Farmers do not show interest in the herbal farming without market assurance. Unscientific and unmanaged exploitation of medicinal herbs from nature is alarming. Report of Red Data Book of IUCN indicate that most of herbs are endangered and some are already extinct or on the verge of extinction. Therefore, there is need to make serious efforts for conservation of natural medicinal herbs and encouraging farmers for 'Health care farming' in the country.

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Language and Technique for popular wildlife Science (Extract from a first person account of life and experience)

Lala Aswini Kumar Singh*

Simple tools and easy interpretations can help a lot for popularizing Science, particularly when it is in the kind that is off the main academics. Here are a few experiences, innovations and lessons under Crocodile Conservation Scheme and Project Tiger which are two nation-wide projects for scientific management of wildlife resource.

Field practices in their projects have largely been successful as the science of Wildlife Conservation has been explained and implemented with appropriate range of field languages and techniques suitable for various levels. It has been done with (a) the staffs at the grass root level who strive to translate theoretical recommendations into field actions, (b) the local people who understand just the simple ways of the nature that has nurtured their character to use and protect the resources for generations, and (c) the students who wish that the Wildlife Science steers them through a meaningful career (d) The remaining public at large and the media are reached with the entire package of approaches.

Wildlife Management prescriptions are strongly directed and improved from experience and lessons learnt in the field. At least three other components which keep changing and interacting on each other also determine the course of management activities. These components are the (a) ecological factors influencing the habitat of wildlife species (b) the changing or adaptive behaviour of wildlife species, and (c) eco-friendly accommodation of the demand and expectations of various anthropogenic elements. All these components have shaped the growth of the science of wildlife management.

Of late I fear, to a certain extent 'Wildlife Management Practices' is digressing away from the realities of requirements in the field. Instead of laying emphasis on indigenous innovations Wildlife Studies and Manangement are getting studied with experiments and recommendations applicable to wildlife from very different biomes in other parts of the globe. As a result, perhaps the Wildlife Science is heading to become an abstract science that is not a true refection of Indian natural history or wildlife biology. There is an increasing trend for applying techniques that appear to overshadow the management of 'wild living beings'. Modern gadgets and statistical extrapolations should be used for improving interpretations and not as a metter of convenience to replace field rigours. It is misleading and dangerous to get satisfied with answer to everything out of very little field data.

One of the many reasons for this trend is rooted to a kind of infatuation reflected through dependency and over-use of virtual mathematical models. Computers and remote sensors are able to provide choice for studies without hazardous field camping. Another reason is the administrative and financial ease for experimenting in the field such costly products which are results out of scientific and industrial growth in the electronic sectors.

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These are fine as supplements that are short lived enthusiasm for adding luster. These shouldn't sacrifice the most established and familiar basics in natural history and wildlife biology.

A population subject easily elicits public cooperation

In 1952 the 'Central Board for Wildlife' was constituted as conservation of wildlife is an important, popular and widely advocated subject of importance for human survival. Later, the Board was renamed as the Indian Board for Wildlife (IBWL) and now it is the National Board for Wildlife (NBWL), with parallel Boards at the State level. The members of the Board are drawn from a wide range of public and professional profile. These members need to be told in simple terms what is all happening in the wildlife section.

In accordance with recommendations of the Board we have celebration of the Wildlife Week, coinciding with the birth day of Mahatma Gandhi. At this time there are publicity through lectures, print and electronic media, film shows, guided nature tours, and essay competitions in schools and colleges. Other activities that popularise and educate different target groups about the Wildlife Science are nature clubs; in educational institutions, and the subject of environmental conservation in the syllabus adopted by the NCERT (National Council of Education Research and Training). The University Grants Commission (UGC) recommended for setting up of faculties of wildlife education in selected universities but the curriculum appears to have only a few takers. The North Orissa University runs a self-financing M.Sc. Course in Wildlife Conservation and Management.

School students are the most respective to conservation message

During 1994-1997 we started to conduct a number of 3-days long nature camps in Similipal Tiger Reserve. There were different participant groups,...the undergraduate students, college faculties, members from the civil society with various professional profiles, and the school students. The purpose was to give a type of once-in-lifetime exposure in the forest, and demonstrate the various wildlife conservation tools and techniques including studying of tracks and signs. The significant lesson for the management was that the High School children constituted the best target group as these were receptive as well as meaningfully responsive.

The language of interaction and the curriculum of a nature camp were very carefully drawn up. Every part of their time during trekking or discussion gave the participants guided orientation and information. The forest guards, foresters, range officers and watchers were very enthusiastic during those days when they could share their life and experience in the forest with wildlife. The language for communication of the art and science of wildlife conservation was simple, interesting and adventurous for the staff and their audience. I have seen, some of the children (students) becoming emotional before the staff when it was time for departure from the forest.

Successful conservation and research go hand in-hand.

'Successful conservation and research go hand in hand.

That was the dictum of approach in crocodile conservation programme launched in 1974-75, and it showed the approach for other wildlife conservation projects. There were two main conservation projects in India during 1970s and 1980s. The approach for handling research was different in the beginning. Fresh pass outs from Universities were selected for crocodile conservation work. But in Tiger Reserves the Field Directors handled research initially, Later, research Officers worked under concerned Protected Area managers or the Chief Wildlife Wardens.

The scientific personnel involved in crocodile conservation programme, project tiger and other wildlife conservation activities in situ and ex situ have produced the bulk of information and literature available today about the target species and the activities for conservation and management. Administration has come to recognize that research personnel form the assured base for access to information. Most often these research persons carry out most of the interpretation work for a project. Special Projects like that for vulture breeding is awaiting a suitable research person to remain in charge of it.

Grooming authors who work and write

My professor from University days, Professor B.K. Behura says research is incomplete without a publication. yes, unless observations are published, a new researcher joining at some later stage wastes days or years in rediscovering what is already known. At this stage come the aspects like authorship of an article or a research paper, and the choice for a journal.

Considering the actual role of a researcher and the need for sustainability of the pursuit for popularization of scientific research, authorship has to be given due consideration. Administrators or technocrats who adorn chairs for supervision need to be open hearted in giving credit. A scientist often works just for the shake of recognition.

I was recently writing my reaction in response to a biog about the not very happy experience for authorship status like first, second, third, etc. in a publication. The contention is about who will be the first author, and what order should be followed upto the last author. In scientific laboratories some kind of understanding seems to have prevailed. This is not true in non-research organisations, where the principal or prime researchers normally brings into his fold of confidence as many 'authors' as possible. At the end the authorship credit may appear to be a hierarchical testament under the title of the paper.

When it is a management prescription it is, however, a good idea to have that kind of authorship. People no matter get encouraged and also implement its advantages.

Nevertheless, I have also noticed that although I have many coauthors during the course of my 36 years of research, very seldom have they produced a technical publication even in their next posting. I have a notion that publication potential is everywhere and in every posting of a person.

During Post-Graduation it was training and, therefore, customary to follow the hierarchy or age-seniority in a research paper. I have taken the facts in that spirit. Things were different after M.Sc. In this context I must pay my tribute to one person – Dr. H.R. Bustard, the FAO Consultant in India for Crocodile Conservation programme. The project started during 1970s, and there I started my professional career. Dr. Bustard was the field guide and non-official Ph.D. guide for me. He had issued a circular very early about the principle to be followed for authorship of technical papers. If it was equal contribution starting from an idea to experimentation or data collection and writing, the authorship was alphabetical, though Dr. Bustard had the alphabetical advantage over me. For other instances, depending on contributions the first authorship was shared among us.

That was a very healthy practice. Other co-researchers were also happy with that. It got flouted when I had to write with (for) others. yet, I always expected, sometime somewhere somebody should bring my name to the first, or while giving a talk or powerpoint presentation at least used a 'plural term' to indicate that the analysis was done with others in the administrative set up. Very seldom did it happen, if it ever did. The sometimes hurts a field researcher, and it dampens the spirit of contributing the pursuit of writing for popularization of science!

Where should I publish my work

The year of start, the international stature of the wildlife project and the locations for my field work were such that most of the observations were new and worth reporting or publishing. Out of over 250 write ups by me only about a dozen may be overseas publications. Others are in Indian journals but with overseas circulation. I always exercised my own choice and option for a journal. I have chosen the journal in such a way that the publication reaches the right audience or the right user.

When I am writing about a new technique which field foresters are to use, I choose Indian Forester which reaches all Divisional Forest Offices of India and many desks overseas. When it is a biological note on an Indian species I have chosen the Journal of Bombay Natural History or Hornbill. When the observations or discussions have implications in captive management of animals in India I chose the Zoos' Print. A very old time journal is Cheetal published by the Wildlife Preservation Society of India, Dehradun. These are very widely circulated and established journals for wildlife matter. The WWF Newsletters, the IUCN Specialist Group Newsletters and Sanctuary-Asia are some of the other publications for submitting write ups.

In those days, there was no 'impact factor' of a journal, and there was nothing like internet to browse and search. I had to build my own library. For the last four decades I have been carrying bulks of paper wherever I went. I came to know about impact factor when my daughter started publishing her work on nano medicines and discuss with me issues relating to it while selecting a journal for submission of papers. In modern days the 'impact factors' seem to be the basis for judging the scientific status of a scientist.

Inspired, I searched the net for any possible impact factor given to my journals, but no. My journals, although very special in their kind and used by field workers, had nothing like an impact factor. I am not aware, what exactly is the situation today. I cannot comment on medical science research, which has global implications. And the trend is changing in the world of research.

What I drive to say is that present day wildlife scientists are competing to gather 'impact factors' through publication of their data overseas, but its utility is often lost to actual field level users. Therefore, where field research involves natural history or techniques for sanctuary management, one must not worry where the journal is published or what is its impact factor; but must think whether the contents of the writing reaches the field staff and field biologist who will benefit from this and shall not spend time in rediscovering what has already been discovered. They should instead carry the work ahead from the point where it is left at that moment. In this respect there should be a mention about the open access journals on the internet these days. These are very good, very quick, available on the net, and perhaps with some impact factors, if someone is bothered about it.

Institution Heads and Administrators who are assessing their wildlife scientists for promotion or a higher scale should not be fussy about the impact factor. Instead mechanisms should be devised to assess usefulness of the research in the field. Unless this is done, wildlife science will have a difficult road for popularisation.

Field-transaction of professional lessons from ingenious masters

As a fresher in wildlife research I had the first opportunity to listen to Saroj Raj Choudhary when he explained near a stream along Tikarpada-Purunakote road on how to interpret hooves marks indicating stampede behaviour of a herd of spotted deer. The herd might have heard or sighted a predator, perhaps the tiger. Through that, Choudhary was giving the basic guidance on how a practitioner of wildlife research should remain alert for visual signs as well as smell and sound to make his field studies fruitful and safe.

During my work in the Mahanadi I had nearly six and a half years of field work with the help of Raja Behera and the team comprising his nephew Prafulla and son Amulya. All three were engaged as Gharial Guards at Tikarpada, as a strategy towards demonstrating people's involvement in crocodile conservation. Many other experienced persons like Narottam and Shibha joined as Gharial Guards later. All of them were boatmen and fishermen by profession. They were able to negotiate their narrow long wooden boat on the waters of Mahanadi along the downstream or upstream or in high flood with as much ease and comfort as they did it during low waters of winter and summer. I had my first lessons of rowing a boat from Prafulla and Amulya.

More important, from Raja and others I also learnt how to spot and confirm the sighting of a crocodile on water surface or on sand banks. Then, there were training sessions by Dr. Bustard on how to eye-estimate the length of crocodiles from a distance.

Those were initiations which kept me water-borne and study crocodiles. Rest of the happenings in my career demonstrated that indeed necessity is the mother of invention. I wanted to judge the size of the crocodile from just the portion of the head that remained

surfacing on water or the various kinds of tale telling spoors of a crocodile that had basked on sand banks. Then I devised the methods for size estimation from body spoor. Similarly, was the invention of the technique to individually identify hundreds of crocodiles from their tail-scute colour pattern. These are simple field techniques that keep the science accessible, usable and popular.

Field techniques have to be comprehensible in implementation and interpretation

One of the major scientific activities in wildlife management is census of wildlife species, at least a few indicator or flagship species, which can indicate the condition or happenings in the entire habitat. The results of census attract the attention of the public, media and the concerned administration. Census results form an easy and direct access to the story of performance of the project on species conservation.

Observing wildlife in natural conditions is not easy because wild animals have learnt to avoid threats or disturbances. That is their strategy and adaptation for survival. The task is more difficult when ground vegetation is dense and high. Determining the exact numbers of wild animals is a difficult technical requirement but has to be carried out with man power available within the Forest Department. By conducting the census the staffs get a first hand feel of the status of the animals inhabiting their jurisdiction, and have a sense of belongingness. Therefore, the technique has to be staff-friendly, something which they can understand, implement and interpret.

For every occasion of wildlife census in Simlipal, about 25 participants from different parts of the state and a few from other states and even overseas join the staffs as non-official volunteers. They all belong to very different walks of life. They are given orientation training about the method of census and the jungle-etiquettes. They live with Forest Guards or watchers in tree-top machans or Beat-Camps and carry out field work during the entire period of census. Again, some of them come back for analysis and interpretation of data, and drawing of spatial distribution map of the species counted. For tiger and leopard they become conversant in pugmark tracking method and for elephants it is direct sighting.

A few of these participants have chanced into my ffoce after several years and interacted with me. In these years some of them have reached new heights of career excellence but they continue to be passionate as before. They have expressed that the visit they had to Simlipal has left a permanent impression in their mind and action. I feel that the level of interactions with them and the quality of data they handled were responsible for such lasting memory. The Science of Wildlife Conservation has to be easy and understandable through simple biological explanations and the application of common logics.

Some lessons and guidelines.

There is no shortcut in Wildlife Science. It has to be backed with full quota of rigorous field exercises carried out locally in the heat or frost, soiled knees or knee-deep humus. While popularising wildlife Science some of the lessons learnt and that may from recommended guidelines are as follows:

- The staffs of the wildlife organization who implement the project in the field must feel themselves a part of the science that is in practice, and should be able to take pride in explaining the subject and the related activities they are doing. These staffs include grass root level persons like the Forest Guards as well as Research Scholars who join with career ambitions.
- The people who live within the forest or its fringe who have already contributed a great deal of traditional knowledge, should be comfortable with the new tools and participate in various management actions directly or indirectly, with a sense of belongingness.
- The spectra of administrators, intelligentsia in the society, public representatives, media person and other stake holding organizations, who too play a substantial role in sustenance of pursuits linked with 'Wildlife Science' must understand the language of the science and be able to convincingly explain these to others in apropos of their own activities.
- In order to achieve the above objectives the Wildlife Conservation Project should have effective monitoring mechanisms.

Interstate migration of Elephant from west Bengal to Baripada Division

Sandeep Ranjan Mishra¹, Anup kumar Nayak², Bijaya Kumar Panda³

Introduction:

Elephant are intelligent animals learning from other herd members the distribution of food and water sources. Elephants develop an intimate knowledge of the resources available in a fixed area (*called the home range*) of their environment which can sustain them over different seasons and many years. A single herd or adult male Asian elephant requires a home range area between 150 and 600 sqkm. Where resources are poor due to habitat degradation or alteration to agriculture home range are typically even larger. However due to human interference and habitat loss elephants are confined to smaller areas leading to overcrowding which result conflicts. Movement over a length of 250 km from Lakhari in Orissa to Andhra Pradesh is known in this region. Home ranges in excess of 600 km have been recorded for females in Nilgiris in South India. In Rajaji National Park in North India, female home ranges of 184-326 km and male home ranges of 188-407 km have been recorded.

Every animal has a specific biological features and ecological requirements for survival. At birth, an elephant is already around 90 kilograms and stands about three feet (1m) tall. The height at the shoulder of an adult is 6.6 to 9.8 ft (2 to 3m). Adults weigh 2.25 to 5.5 tons (2,041 to 4,990 kg).

Such a large animal as it is an elephant needs to consume large quantities of food every day. They are not specialist feeders. They browse and graze on a variety of plants. More than 75 species have already been identified which serve as elephant fodder. An ideal elephant habitat should therefore have a variety of natural food species. The proportions of different plant types in their diet vary depending up on the habitat and season. Elephants may spend up to 14-19 hrs a day feeding, during which they may consume up to 150 kg of wet weight. This paper presents an details of Migration and movement of elephant from West Bengal to Baripada Division in the year 2010.

Study Area

The Baripada boundary proceeds south and then eastward from Satabankara hill top along Bihar-Orissa State border up to Jamsola, and then along West Bengal-Orissa State border upto Santeliya. Then it proceeds southward along Gulfa Nala upto Guhaldiha (near Bagra), then proceeds westward along Bagra-Baripada Road upto Munduri Bandha, then proceeds north-west along Munduri-Bankisol road upto Bankisol, then proceeds northward along Baripada-Deuli road upto Kuabuda chhak, then along Kuabuda-Chandua road upto Dardara village, then along Darbara-Kathasirsi road upto NH-5. From Kathasirsi it proceeds northward along NH5 up to Kalabadia, then moves westwards to touch river Budhabalanga and then moves southward along Budhabalanga river upto the confluence of Sankiri nalla. Then it proceeds upstream of Sankiri nalla and touches Similipal RF near Gendapokhari. Then it follows the boundary of Similipal RF in a southerly direction upto Nato RF,

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encircles boundary of Nato RF upto Purunapani village. Then it follows the road Purunapani-Sarat-Sarisua-Padmapokhari-Kaladahi upto Nilgiri. Then it proceeds southerly along the road Nilgiri-Santaragadia-Baulagadia-Bagudi, goes north and then touches the southern boundary of Debgiri RF upto Hatikholia. Then it follows the boundary of Debgiri RF in south-west direction and continues along southern boundary of Kuldiha RF, Garsahi RF, Mahisadali PF, Gogua PF and Bandhalata PF to touch the boundary of Baula RF in Keonjhar Division.

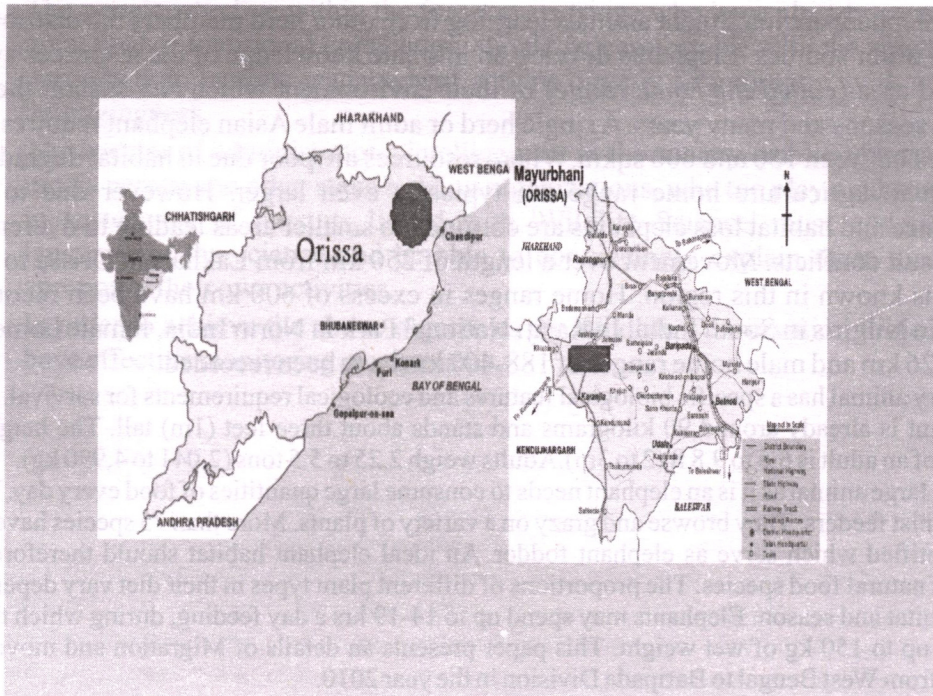


Fig-1, Map of the Study Area

Detail Movement of migratory Elephant in Baripada Division during 2010:05.11.10- A herd of elephants consisting of 69 nos entered from West Bengal border (*Bhaduasole*) to Rasgovindapur range at about 7.00 pm. The elephant herd was divided in to two sub-groups. One Groups of Elephants consisting of nearly 66 nos proceeded to Krushnachandrapur-Jambani-Raghunathpur-Subandi-Sunakhania-Ukasole-Dudhiasole-Rangamatia.

The other Group Consisting of 3 nos moved towards kanjiamunda-Tukpalsia-Palasmundali-Chotryapur-Chiktamatia-Bhatchhatar-Badsole-Dhiradhi-Chauldhuni and then went back to west Bengal through Dhansole Village.

06.11.10- The First herd moved to Rangamatia Aero Drum field Nalagaja-Harekrushnapur-Rasgovindapur-musamari-Angargadia-jambhirariver-Khuntapal-Biripal and halted at Kapoi RF near Biripal of Betnoti range.

07.11.10- The herd moved from Biripal and halted at Kapoi-Panchabhaya-Saidpur-chhatna RF and halted at Chhatana RF near Saidpur of Betnoti Range.

08.11.10- The herd moved from Saidpur to Makund-Angaria and back to Saidpur- Chhatna RF and halted at Chhatana RF near Saidpur of Betnoti Range.

09.11.10- The Herd Moved from Saidpur to Makund- Angaria-Rautra-Sansa- Mamtapal and back to Saidpur .Halted at Chhatana RF near Saidpur of Betnoti Range.

10.11.10- The herd moved from Saidpur- Makund-Angaria-Rautra-Sansa-Mamtapal and back to Saidpur-Mamtapal-Tilda and halted at Jugal RF near Tilda of Betnoti Range.

11.11.10- The herd moved from Tilada to Bhurkudia- Dhabanisole-Jugal.Crossed NH-5 Hatijhari-Bagalpur- Fuljhari and halted at Fuljhari RF of Betnoti Range.

12.11.10- The herd moved up to khandadeula village of patalipura GP and came back to Dalki RF near khunta.

13.11.10- The herd Moved to Budhabalanga River and Came back to Dalki RF.The Elephant Herd movement was stopped by public near village Patalipura, Pratimadeipur for which the Elephant herd could not proceed and the Aggressive tuskers damaged one house in Silpuria village where 3 goats and 2 poultry were killed by collapsed walls.

14.11.10-16.11.2010-

The Herd Stayed at Dalki RF near silpuria village from 13.11.10 to till 16.11.2010, 6.00 pm. Then the herd moved to Nilgiri Sub-division of Balasore district. On 25.11.2010 the herd again returned to Dalki RF near Silpuria village. On 26.11.2010 the herd moved to fuljhari RF.on 27.11.2010 the herd went to Jugal RF near Tilda Village. On 29.11.2010 majority of the herd moved to forest near Saidpur village from Tilada village. On 30.11.2010 the herd moved to Moroda RF of Rasgovindapur Range and staying about 4 kms from State Border.

The Elephant Herd movement was stopped by public near village Patalipura, Pratimadeipur for which the elephant herd could not proceed and the aggressive Tuskers Damaged one house in Silpuria Village where 3 goats and 2 poultry were killed by Collapsed of walls.

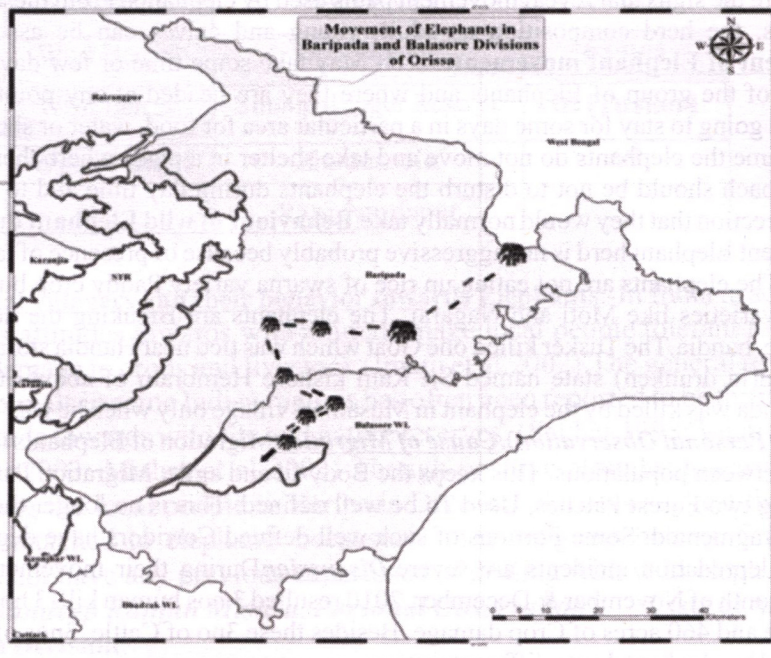


Figure-2, Map showing the Movement of Elephant in Baripada Division

Herd Composition: Presently the elephants herd consists of 7 nos Tuskers, 10 nos of adult Female, and 48 nos of other Elephants (**Consists of Sub-Adult, juvenile and Calf**). **Identification of Tusker** Tusker can be identified from different angles like From Tusk, tail and Back arch. But in the field condition it is easily to access from Tusk and Back arch.

SL No	From Back arch	From Tusks
1	Bow Backed	Divergent Tusks
2	Low broken Peaked	Unbalanced Tusks
3	Straight Backed	Divergent Tusks
4	Medium peaked	Parallel
5	Slopping Back	Slopping Towards ground
6	Humpback	Slopping Towards ground
7	Square back	Short, Straight Tusks no particular distinctions

How to Track Elephants/Tuskers in Field Foot prints, fresh dung heaps and damages to vegetation during feeding are the signs that reveal movement paths used by elephants. From these signs the size of the elephants, the herd composition as adult, young and calves can be assessed to some extent. **Assessment of Elephant movement:-** It May take some time or few days to assess the original habitat of the group of Elephants and where they are headed at any point of Time, and whether they are going to stay for some days in a particular area for food, water or shelter. Normally during the day time the elephants do not move and take shelter in a place where there is some tree cover. The approach should be not to disturb the elephants during day time and to facilitate their passage in the direction that they would normally take. **Behaviour of wild Elephant during 2010**

The present Elephant herd is not aggressive probably because of presence of large number of calf Elephants. The elephants are not eating up rice of swarna variety Paddy crop but are eating up local Desi rice varieties like Moti and Nagaraj. The elephants are Breaking the houses only for country liquor i.e. handia. The Tusker killed one Goat which was tied near Handia storage house. One Paralysed person (in drunken) state named Sri Ram kishore Hembram of about 50 years of age sleeping in Varanda was killed by the elephant in Musamari village only when he was Trapped by the irritated Crowd. **(Personal Observation).** **Cause of Migration** Migration of Elephants is also essential for Gene flow between populations. This keeps the Body fit and agile. Migration Paths, called The Corridors linking two Forest Patches, Used To be well defined. This is no longer the Cases, as the paths have got fragmented. Some Portions of such well defined Corridors have degraded to mere passage where depredation incidents are severe. **Discussion** During their movement in Baripada division in the month of November & December, 2010 resulted 3 nos human kill, 3 nos injury, 80nos of house damage and 460 acres of Crop damage. Besides these 3no of Cattle, 3nos of poultry and 3 nos of Goat killed by elephant due to different reasons.

Inter-State migration Of Elephants (Mayurbhanja Districts)

Eastern India (also Called as Central India) elephant population is Confined to Orissa, south west Bengal and Jharkhand. There is Continuous Migration of Elephants from Orissa to Jharkhand and Vice-versa. Particularly between elephant population of North Kendujhar and adjoining area of Bonai Forest division of Orissa and Saranda Forest Division of Jharkhand. There are 140 to 150 elephants in Sarnada Forest. The Tholkabad forest block of Saranda division is connected with the Toda Forest block of Bonai Division. Mosabani Forest area of Jharkhand which is situated south of River Subarnarekha has an isolated elephant's population of 20 to 30 (Shahi et al 1985). This elephant population migrates to Kendujhar-Mayurbhanja Border of Orissa as well as Deoli Forest at the Orissa-west Bengal Border. A few incidents recorded from these areas are given below. (From 2003-2010).

Interstate Migration of Elephant in Baripada Division Year 2003 -2010

Year	State From where Entered	Entry point	No Of Elephants Entered
2003	West Bengal	Deoli & Rasgovindapur	07 nos
2004	West Bengal	Deoli, Pithabatha, Dukura	05 nos
2005	West Bengal	Dukura Range	21 nos
2006	West Bengal	Deoli Range	24 nos
2007	West Bengal	Deoli Range	63 nos
2008	West Bengal	Similipal Tiger Reserve	01 (Tusker)
2010	West Bengal	Bhaduasole, Rasgovindapur	69

Attitude Local villagers and their behavior towards Elephants: In India, traditional, cultural and religious attitudes towards wild animals make local people tolerant towards wild life, despite the damage to crops and livestock (Imam et al. 2002). The general reverence towards plants and animals in some Indian regions has often been reported to be the main reason for a positive attitude towards wild life and nature reserves (Sekhar 1998; Vijay an & Pati 2002; Madhusudan 2003; Mishra et al 2003). Though positive attitudes towards elephants still persists among the local people in Baripada Division. Surveys suggest that the locals are emotionally attached to elephants because of their religious beliefs. Since most of the Villagers do not have any previous experience of dealing with wild elephants, they live in great fear. (Sandeep Ranjan Mishra, Personal Observation). **Lists of Affected Villages in Baripada Division:**

SL No	Name Of The Affected Villages	SL No	Name Of The Affected Villages
1	Sangadihi	19	Dhansole
2	Chua sole	20	Bhalia
3	Saria	21	Amanida
4	Gudisahi	22	Chitadihi
5	Nimudiha	23	Dahikuti
6	Agadachilbasa	24	Chhachinapada
7	Bahanada	25	Mouda
8	Pandugadia	26	Nuagon
9	Renugaon	27	Nadpur
10	Kutubadi	28	Khunta
11	Sarbana	29	Dariha
12	Sarbana	30	Kathpal
13	Patpur	31	Chilbasa
14	Purunapani	32	Khirpada
15	Gobrasole	33	Hatijhuri
16	Durgapur	34	Bhudurubani
17	Tikarbat	35	Kusunpur
18		36	Dalki

Photo Section



Photo-1, Tusker Crossed NH-5 near Betnoti



Photo-2, Herd entered into Reserve Forest

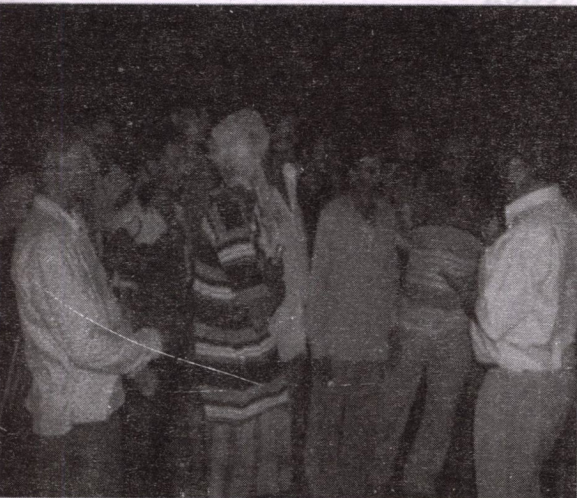


Photo-3 Villagers& forest Department during Night patrolling



photo-4 Crop Damaged by Elephant herd near Saria

Chart Section

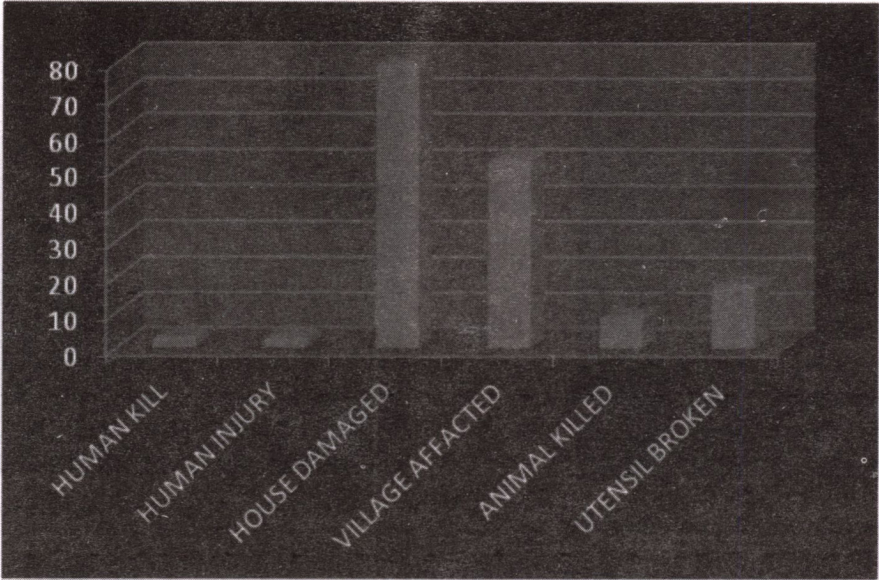
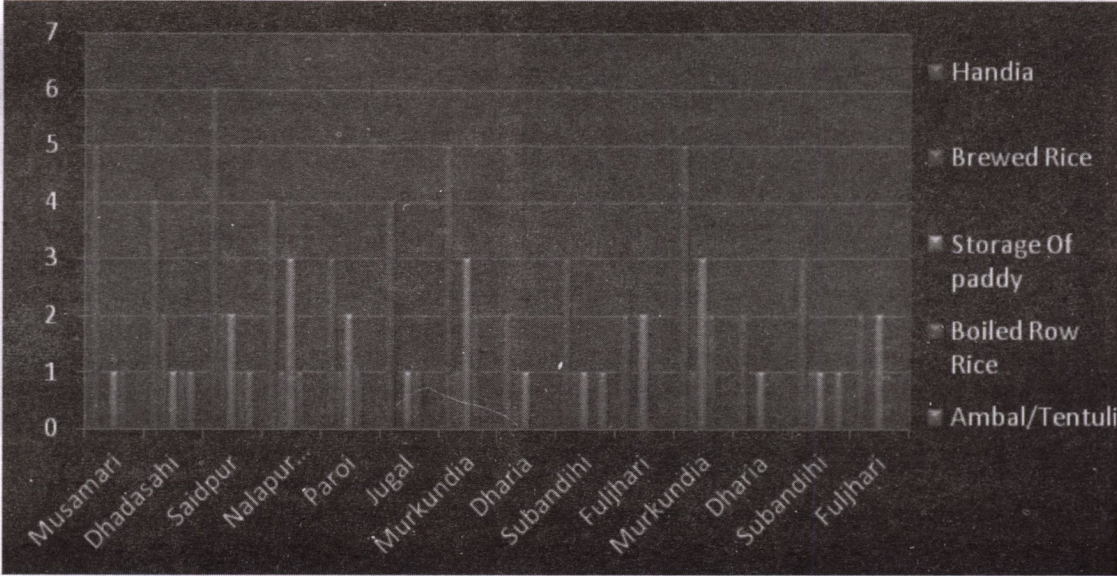
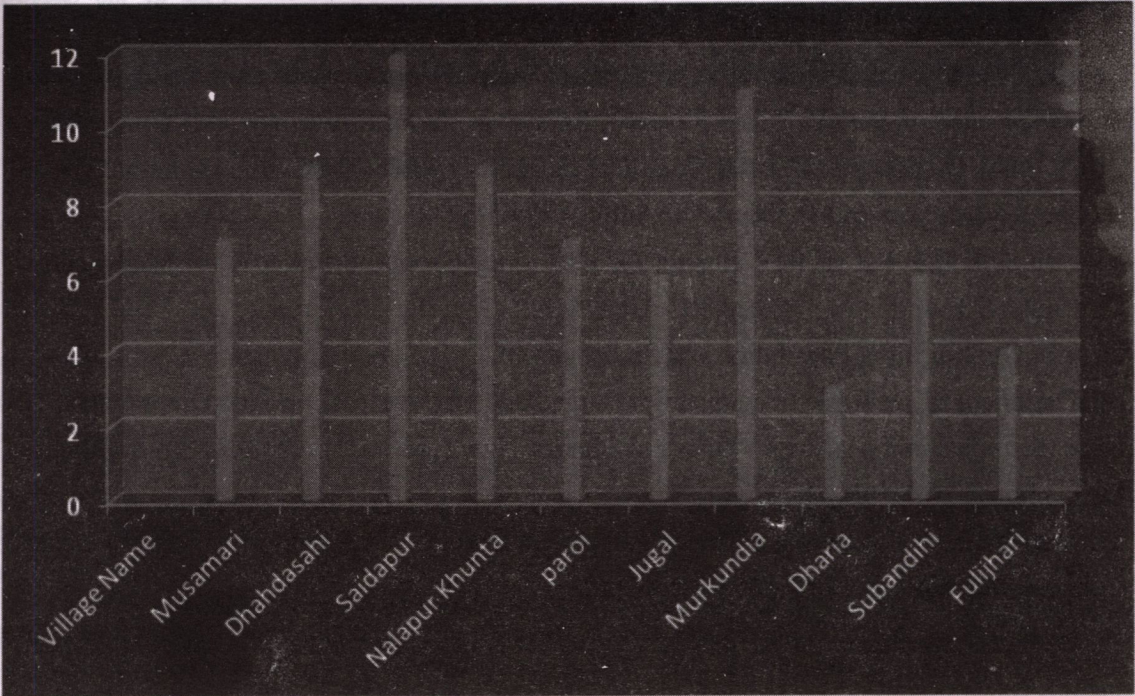


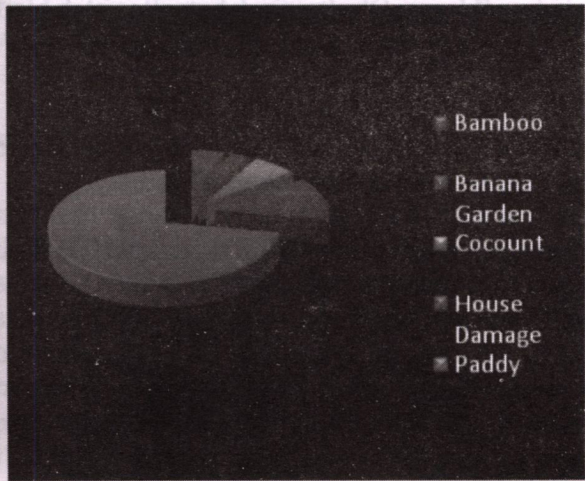
Chart Section



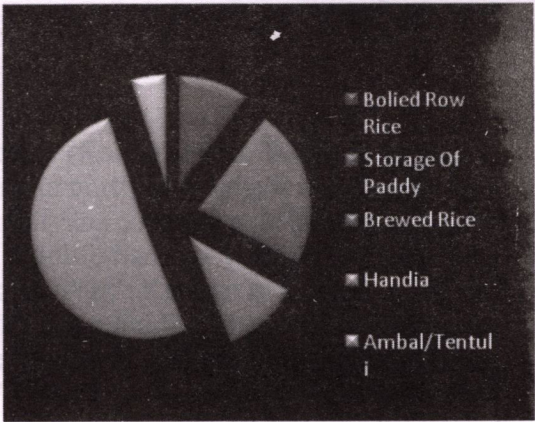
Number of House Damage Due to Different village by elephant in Baripada Division
Due to storage of food



Number of House Damage in Baripada Division



Damage by elephants



Damaged by Elephants due to different

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On population of Non-human Primates of Kalesar National Park and

Wildlife Sanctuary, Yamunanagar, Haryana, India

J. P. Sati and P.C. Tak*

Introduction

Of the fifteen species of Non-human Primates (NHP) occurring in India, only two species, namely, the Rhesus Macaque (*Macaca mulatta*) and the Hanuman Langur (*Semnopithecus entellus*), belonging to family Cercopithecidae (Primates : Mammalia) are found in Kalesar National Park and Wildlife Sanctuary, Haryana.

The general information on Indian mammals, including the Non-human Primates, is available in indispensable books by Jerdon, (1867), Blanford (1888-91), Ellerman and Morrison-Scott (1951), Prater (1971), Wilson and Reeder (1993), Menon (2003), and Alfred *et al.* (2006).

Where as the species-wise detailed information on the Indian NHP especially on Rhesus Macaques and Hanuman Langurs has been provided by the eminent workers such as: Pocock (1939), Lindburg (1971), Roonwal and Mohnot (1977), and Roonwal *et al.* (1984). While the important demographic studies on these two NHP found in northern India are by Jay (1965), Neville (1968), Southwick and Siddiqi (1966, 1968), Lindburg (1971), Makwana (1978), to quote a few.

The present communication on population of these two NHP species is based on the field data collected during the 'General Faunistic Surveys' under the 'Fauna of Conservation Areas Series' of the Zoological Survey of India.

Study area

Kalesar National Park and Wildlife Sanctuary (Kalesar NP & WLS) is located in northern Shiwalik tract to the west of river Yamuna in north-eastern part of Yamunanagar district, Haryana. It is the largest Protected Area in Haryana covering c. 250 sq km (c 25,000 acres). Of this, c. 134 sq km falls under 'Kalesar Wildlife Sanctuary' while the remaining area of c 116 sq km comes under 'Kalesar National Park'. Kalesar is located at the co-ordinates 30°20'43.97" N latitudes and 77°33'13.72" E longitudes. The altitude of the park ranges from 200 to 1,200 m and receives average rainfall of 970 mm. Temperature in the park varies from 3° C in winter to 44° C in summer. The park has been assigned IBA site code IN-HR-03 under the criteria A1 (Globally Threatened species) & A3 (Biome-Restricted Assemblages) by Islam and Rahmani (2004). By road, it is c. 200 km from Delhi via Yamunanagar, c. 100 km from Dehra Dun and c. 150 km from Chandigarh via Paonta Sahib.

Kalesar forest is primarily a Sal (*Shorea robusta*) forest with other predominant tree

species such as: Khair (*Acacia catechu*), Shesham (*Dalbergia sissoo*), Semal (*Bombax ceiba*), Amaltas (*Cassia fistula*), Bahera (*Terminalia belerica*), Rohani (*Mallotus* sp.), etc. The Sal forest is dotted with a number of termite mounds. Commonly occurring shrub species of the area are: *Adhatoda* sp., *Murraya* sp., *Zizphus* sp., *Dendrocalamus strictus* etc. The important grasses being: *Saccharum* sp., *Chrysopogon* sp., *Heteropogon* sp., *Erianthus* sp., etc.

The conspicuous feature of the area is the boulder-strewn water courses created by heavy runoff during the monsoons on its southern side which ultimately joins the plains. These erosion beds are locally known as 'khols' sometimes with very steep slopes.

Methodology

To estimate the population of these two NHP species, observations on group size and composition were made from February 2008 to February 2010. During this period, regular surveys (day-visit) were undertaken, at monthly interval. Using name of the locality, where the group was repeatedly seen, and the group was assigned its name. To minimize errors, the counts were repeated two to three times. However, only the highest count was taken in account and presented here to project the optimum group size. For group composition, the following five sex and age categories, viz., adult male, adult female, sub-adult male, sub-adult female, juvenile and infant, which are widely in use, were followed. The GPS readings were also recorded with the aid of an etrex GPS of Garmin make for location of each group, whenever possible (Table 1 & 2).

Results

1. *Macaca mulatta* (Zimmermann), Rhesus Macaque: Has been assigned the status of Lower Risk least concern (LRlc) (Nationally) and Data Deficient (DD) (Globally) by the Conservation Assessment and Management Plan (CAMP 2003); listed as Lower Risk near threatened (LR/nt) by the International Union for Conservation of Nature and Natural Resources (IUCN 2008); and listed under Schedule II of the Indian Wildlife (Protection) Act [IW(P)A 1972].

A total of 491 individuals of rhesus were counted in 14 groups. All the groups were bisexual. The group size varied from 15 to 76 individuals. The largest group of 76 individuals was observed at Tajewala barrier. The overall average group size was 35.07, with an average of 3.4 adult males, 10.57 adult females, 1.7 sub-adult males, 1.78 sub-adult-female, 10.5 juveniles, and 7.07 infants. The adult male to adult female sex ratio was 1: 3.08 and female to young ones (juveniles and infants) ratio was 1: 1.66. The details of group composition recorded for each group is presented in Table 1.

Table 1. Showing group composition of rhesus macaque as recorded at Kalesar NP & WLS

Group Number	Date	Group	Adult Male	Adult Female	Sub-Adult Male	Sub-Adult Female	Juvenile	Infant	Total	North Latitudes	East Longitudes
1	23.xi.2008	Lal Dhang	1	4	1	1	5	3	15	30°23.3'70"	77°33.128'
2	23.xi.2008	Kalesar Temple	3	10	3	2	7	4	29	-	-
3	22.vii.2008	Bara Sot	4	10	1	2	12	8	37	30°20.085'	77°04.410'
4	24.xi.2008	Faipzur	3	8	-	1	10	6	28	30°19.452'	77°04.102'
5	18.xi.2008	Hathnikund	3	11	2	3	9	8	36	30°19.290'	77°02.579'
6	23.xi.2008	Tajewala barrier	7	23	5	5	24	12	76	-	-
7	17.vi.2008	Amwali Khol	3	10	1	2	9	6	31	30°19.437'	77°32.718'
8	14.x.2009	Kalimandir Khol	3	8	2	2	9	6	30	30°12.308'	77°33.804'
9	18.xi.2008	Tibdi Khol	2	6	1	-	5	4	18	-	-
10	7.ii.2008	Khillonwali Khol	3	10	1	1	8	6	29	30°18.905'	77°33.799'
11	24.ii.2010	Chicken Khol	4	14	2	2	14	10	46	30°22.955'	77°29.404'
12	19.xii.2008	Kansli Khol	4	8	1	-	8	6	27	30°19.450'	77°34.103'
13	19.xi.2008	Darpur Khol	6	19	3	2	21	14	65	30°19.299'	77°32.579'
14	24.xi.2009	Nangli Khol	2	7	1	2	6	6	24	30°25.037'	77°25.503'
		Total	48	148	24	25	147	99	491		
		Average	3.4	10.6	1.7	1.8	10.5	7.1	35.07		
		Male : Female	1	3.08							
		Female : Young	1	1.66							

2. *Semnopithecus entellus* (Dufresne), Hanuman Langur: Has been assigned the status of Lower Risk least concern (LRlc) (Nationally) and Data Deficient (DD) (Globally) by the Conservation Assessment and Management Plan (CAMP 2003); listed as Lower Risk near threatened (LR/nt) by the International Union for Conservation of Nature and Natural Resources (IUCN 2008); listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 2010); and listed under Schedule II of the Indian Wildlife (Protection) Act [IW(P)A 1972].

A total of 230 individuals of langurs were counted in nine groups. All these groups were bisexual. The group size varied from 13 to 36 individuals. The largest group of 36 individuals was observed at Faizpur. The overall average group size was 25.5, with an average of 2.55 adult males, 10.0 adult females, 1.33 sub-adult males, 0.77 sub-adult-female, 5.0 juveniles, and 5.88 infants. The adult male to adult female sex ratio was 1: 3.91 and female to young ones (juveniles and infants) ratio was 1: 1.08. The details of group composition recorded for each group is presented in Table 2.

Table 2. Showing group composition of Hanuman Langur as recorded at Kalesar NP & WLS

Group Number	Date	Locality	Adult Male	Adult Female	Sub-Adult Male	Sub-Adult Female	Juvenile	Infant	Total	North Latitudes	East Longitudes
1	23.xi.2008	Lal Dhang	3	11	-	-	4	7	25	30°23.370''	77°33.128'
2	23.xi.2008	Bara Sot	3	14	2	3	6	7	35	30°20.085'	77°04.410'
3	10.ii.2009	Faizpur	3	13	3	2	8	7	36	30°19.452'	77°04.102'
4	10.x.2008	Amwali Khol	2	9	1	1	3	4	20	30°19.437'	77°32.718'
5	8.viii.2008	Kalimandir Khol	3	10	3	-	8	8	32	30°12.308'	77°33.804'
6	7.ii.2008	Khillonwali Khol	2	6	1	1	4	3	17	30°18.905'	77°33.799'
7	19.xii.2008	Kansli Khol	3	12	1	-	4	6	26	30°21.661'	77°29.111'
8	25.v.2008	Darpur Khol	3	11	-	-	4	8	26	30°19.299'	77°32.579'
9	24.xi.2009	Nagli Khol	1	4	1	-	4	3	13	30°25.037'	77°25.503'
		Total	23	90	12	7	45	53	230		
		Average	2.55	10	1.33	0.77	5	5.88	25.5		
		Male : Female	1 : 3.91								
		Female : Young	1 : 1.08								

Discussion

The species wise total NHP population of the area, its group size and composition as observed in various localities of Kalesar NP & WLS, Haryana has been detailed above.

A total of 491 individuals of Rhesus were counted in 14 groups. The size of these 14 groups varied from 15 to 76 individuals. All the groups were bisexual. Occasionally solitary male were also found (e.g., an adult male- locally known as 'Sita Ram' inhabiting the Kalimandir khol area). The average group size of the 14 groups was 35.07, which is almost in concurrence with the average group size of 32 as reported in similar adjoining habitats of Shivaliks in northern Uttar Pradesh (now Uttarakhand) by Lindburg (1971). The adult male to adult female sex ratio observed was 1 : 3.08 and adult female to young ones (juveniles and infants) ratio was 1 : 1.66, which is also almost in conformity 1 : 2.8 and 1 : 1.7 respectively (Lindburg, 1971).

Similarly, a total of 230 individuals of Hanuman Langur were counted in nine groups. The overall average group size of nine groups as observed in Kalesar NP & WLS was 25.5, which is within the average size of 15-35 individuals in bisexual groups as mentioned by Roonwal and Mohnot (1977). The average adult male to adult female sex ratio was 1 : 3.91, which also within the average adult sex ratio 1 : 1.8 to 1 : 5.6 (Roonwal and Mohnot, 1977).

Remarks

During the present survey, five groups of Rhesus having more than 200 individuals (constituting c 45% population) were observed along the road sides (NH 73A), which passes through the north-eastern part of the Park from Laldhang to the Tajewala barrier (c. 10 km). Most of the remaining groups were encountered near the villages situated long the periphery of the reserve. Seldom were a few groups seen deep in the forest. Similar observations have been made by the authors in and around Rjaji National Park spread over in Dehradun as well as Haridwar districts also (Sati and Tak 2007). The shifting of these monkeys from their natural forest habitat to the road-side may be due to the following reasons:

- i) increasing encroachment of forests by ever increasing human population,
- ii) decreasing number of trees that provide natural food to these NHP,
- iii) decreasing foraging ground-cover (either due the increasing demand for animal fodder or may be due to the frequent forest fires during summers),
- iv) decreasing availability of water resources in their natural habitat,
- v) an easy access to the agricultural crops and orchards in and around the villages,
- vi) increasing dependency of these NHP on artificial food provided by people, since both (Rhesus Monkey and Hanuman Langur) are a part of our culture and religious belief, etc.

In the recent past, there has been a drastic increase in monkey population in and around human habitations from 30% (c.200000 in 1980) to 55% (c.500000 in 1999). This is

going to increase further, particularly in absence of the proper management plans for forests as well as the commensal monkeys. The wildlife management in India has to be more holistic in its approach, and more attention needs to be paid to the issue of management of the wild but commensal species, besides large mammalian species. Of the major problems faced by the government is one posed by the animal welfare activists (the use of primates in biomedical research, in inhuman conditions). The other is the reaction of the masses (who have always regarded primates as part of our culture and religious belief). Hence, for a successful and meaningful management to reduce and stop man-monkey conflict, the government should be sensitive to the above-mentioned issues (Malik 2001).

Usually, such man-animal conflicts are culminated in loss to the animals only (here monkeys). Recently, one such incidence has taken place in the state of Himachal Pradesh where the farmers had been complaining to the state government about the havoc created by wild animals such as: monkeys, wild boars, jackals, hare, black bears and parakeets over the past few decades. The state government after realizing the problem of animal menace, with sensitivity, backed a farmer outfit's plan to shoot monkeys at sight under "Operation Monkey" in December 2010 as the simian has been causing huge damage to crops.

Although trapping and translocation, sterilization, scientific culling, etc. of monkeys are widely used wildlife management tools to mitigate such problems. However, it is suggested that will it not be a better option to have a timely control on the human population instead of using various words and terms such as: man-animal conflict, man-monkey conflict, monkey-menace, operation monkey, etc. and then ultimately shooting these innocent monkeys?

Acknowledgements

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Communication Among Animals

* S.P. Singh and M.K. Purohit,

In humans, informations and ideas are mostly conveyed through words and signals, but other members of animal kingdom have their own language to communicate. For example Croaking of frogs, singing of birds, squeaking of mice, colourful patterns of fish, distinct scent of musk, dance of bees etc.

Mostly signals are used between members of same species, but are equally useful for other species. Like the expression of humans such as smile for happiness and frown for displeasure, animals signals can also be interpreted for their feelings. A loud bark of a dog rather than a weak one indicates greater discomfort. More often than not, animal language is not very easy to interpret, especially that of higher animals which form social groups. The signals of many animals are quite similar and cannot transmit distinct meanings, a signal can mean different things to different listeners. A bird song usually has a variety of information coded in it. It may indicate the species to which the bird belongs. For female of same species, the song means time for mating. For a male, it means competition. Usually, song of birds attract females of same species and repels male.

MECHANISM OF CONVERSATION IN ANIMALS:

Animals which are accustomed to feed at a particular place maintain their territories by signals. They make their presence felt by making sounds frequently. But, if an intruder appears they often resort in visual 'Language'. Rival Deer, march beside each other making loud noise. Ultimately, the one which stays longer emerges the winner. Sometimes, this visual display leads to fight. In birds too, such visual display precede an actual fight and enable them to assess their strength without spilling blood.

LANGUAGE OF ANIMALS IN DANGER:

If a group of animal or birds is in danger, alarm signals are sounded. Birds emit a thin, high pitched 'seep' call when in danger. This call makes it extremely hard to locate the birds and at the same time alert others. The alarm call is similar in several species and it is difficult to specify the sender. Birds have alarm signals common for all predators. Vervet monkeys produce different call for snakes, eagle etc. and react accordingly. Many birds also mimic the environment and other to escape from predators.

FORMS OF SIGNALS:-

Most animal signals take place in the form of a sight, sound or smell. Each of these forms has different properties and benefits. For instance, visual signals travels more rapidly than sound or smell. But unless the animals is large enough, the visual signals sent by it can not be seen

from a distance. As the visual language needs a clear path without obstacles, it is usually used for short distance communication such as in courtship displays, and female monkeys have swollen and brightly coloured rear at quation eriod to attract males.

SIGNALS IN LIGHT:

Animals that use visual language need daylight. But fire-flies communicate during night. They are efficient light emitters, which emit light without heat. Each species of flies has a characteristic pattern of light flashes. Among a species, both male and female have different pattern. For photinus macdermotti, the male emits two flashes two second later. Such species specity in flashing light enable a female to obtain males belonging to the same species. The classical example of visual communication is dance language of honey bee.

FEW EXAMPLES OF CONVEYING MESSAGE AND THEIR MEANINGS:

Sound waves can radiate in all direction s and can travel more rapidly for a longer disintance in water. Birds syrinx produces varied sound in quick succession to express different messages. Songs of Humberk whales can be heard at least 1200 km. away.

Frogs have vocal sacs to amplify the sounds they make. Only male frogs have vocal sacs and the croaking is partcularary heard during breeding season. Grass hoppers produce sound by rubbing their hind legs against their wings and rabbits thump their feet on ground. The dance in honey been which resembles figure fight indicates the source of food: if the food source is in line with sun, the dance is upward on the comb, and if it is opposite the sun, the dance is downwards.

Monkeys and paes almost resemble humans in communication. Though none of the animals has the sophistication of human language, each means of communication is quite complex and is successfully conveyed.

From the Archives of Cheetal

The Tiger – An Assessment

*Arjan Singh

The tiger has been maligned as well as romanticised and both these facts have been to the detriment of this prince among animals. "As cruel as tiger" and "as bloodthirsty as a tiger" are idiomatic parlances in the English Language which are commonly used, and are a complete travesty of reality. It is worthwhile, therefore, to examine the status of the tiger in his natural surroundings.

The earliest known fossil remains of the tiger were discovered in the New Siberian Islands well within the Arctic Circle, according to Prater, but Central and Northern Asia is believed to be the original home of the tiger. The Ussurian tiger of Mongolia and Manchuria is a much larger specimen than the better known animals of the tropics and sub-tropics where climatic and environmental conditions have modified the tiger as it now exists in South East Asia. The tiger is, therefore, in its original form of the largest of the true carnivores, and due to its individuality and surroundings represents the ultimate among the beasts of prey. Its offensive armament consists of four canine teeth of which the lower ones are slightly smaller than those in the upper jaw. Approximately two thirds is enclosed in the jaw bone, and may attain a length of 5-6 inches for a large animal. The claws of which there are five in the fore paws and four in the hind are powerful, and enclosed in protective sheaths. This formidable armament is nature's bequest for its survival, for the tiger is entirely carnivorous. The average tiger weighs between four and five hundred pounds, though an outsize specimen of 705 pounds is mentioned by Smythe in his 'Big Game Shooting in Nepal' as having been shot by the Maharaja. His strength is prodigious and Smythes in the same work mentions a tiger as having leapt up a sheer river bank of 20 feet with a buffalo bait in his mouth. However, though the tiger is the ultimate in killing efficiency he is often hard put to it to feed himself. Often travelling a linear fifteen miles a night, the questing tiger is heralded by the alarm calls of the denizens of the forest on whom, he preys. His strong odour wafted on every stray breeze, often outpaced by the animal he has patiently stalked, it seems the odds are heavily against him, and with the precipitous decline of the deer tribe due to indiscriminate poaching it would appear that the dice are heavily loaded against the survival, for on the availability of food depends, the birth and survival rate of the young. Contrary to belief the normal tiger is seldom entirely a cattle killer. The tiger hunts between sunset and sunrise, whereas cattle graze in the day. Moreover, the human association is always present when livestock is killed. And finally pig and venison are more to the taste of the discriminating tiger than a straggler from the myriad bony scrub cattle which clutter the jungle fringes. It is only the imbalance created by the predatory human that forces the carnivora to change its hunting habits. The

*This article first appeared in Vol IX, No. 2 Published in April 1967

tiger is supposed to kill twice weekly. This may vary, and sometimes over a week may go by without a kill. When he does the tiger gorges himself and it is astonishing the quantity he can consume. A pig of 200-250 lbs will be almost entirely consumed in a night, which would mean a flesh consumption of well over 100 lbs. These dietary habits, however, seem to suit the metabolism of the tiger, as zoo animals which are fed daily can never hope to attain the dimensions which are common in the wild state.

Enough has been said to show that the tiger has no easy life, and this alone would preclude any wanton destruction of life by predators. True more than one animal may be killed in a herd, but that is when the killer instinct has been aroused and the tiger is a killer par excellence. He does not hunt for sport which is the prerogative of the human, but for survival, which is the instinct of the animal. It is said that one picture is worth a thousand words, and the fact or the crouching tiger is surely not 'cruel', or 'blood thirsty'. He patiently awaits the departure of the blundering elephant from the vicinity of his kill. With a certain imaginative detachment one might feel like stroking him!!

The tiger epitomizes the romance of the jungle, the powerful forces just outside the flickering focus of the firelight so well portrayed by the lines quoted in Champion's book:-

When sunset lights are burning low
When tents are pitched and campfires glow,
Steals o'er us ere the stars appear,
The furtive sense of jungle fear.

Despite talks of the 'Big Five' of Africa, and the gigantic Kodiaks and grizzlies of Alaska, there is no doubt that the genus panthera is the prize among trophies, which brings us to a comparison of the lion and tiger, the latter according to hunters is definitely the finer trophy, not only because of his flamboyant colouring, but the solitary existence, the jungle environ and the difficulty of catching a glimpse of him is in the contrast with the drab coat of the lion, the open and dry country he lives in and the prides which are so easily met up with. The lion was once found over the whole of Northern and Central India so far south as the Narbada, and it is claimed that the more powerful tiger was the cause of its disappearance from most of India. This, however, is probably not true, as the different type of country they lived in would preclude their coming into contact. What is more probable is that due to their accessibility the lion was exterminated by sportsmen, whereas the tiger survived because of his more seclusive existence. Moreover, according to Gee they are about equal in strength, and certainly the measurements seem to be similar. Jim Corbett used to claim that the tiger was the more powerful animal and he knew them both in their wild state, but Clyde Beatty and circus performer who had an act of 40 mixed lions and tigers gave the edge to the lion.

The tiger is, therefore, hunted by foreigners as the major trophy animal of the world, and by the indigenous shikari as the relentless cattle-lifting menace who makes the jungle unsafe for democracy. The foreigner brings the much needed exchange, and the declaration of a cattle-lifter, the much needed vote, so where does the tiger stand in the scheme of things.

It seems that he is fated to disappear inspite of what is claimed by the pundits of the Forest Department. They say that tigers have increased, but this is not based on census, but conjecture. Tigers are now more readily visible and heard of as with the advance of cultivation to the fringe of the forest, and the rapid diminution of deer due to poaching and indiscriminate slaughter, the tiger is forced to forsake the deep woods, to seek his prey in the vicinity of man and his cultivation.

Secondly, Nepal once the breeding ground of tigers is being heavily felled, colonised, and disturbed, and a local increase in the tiger population may well be due to an unprecedented influx from Nepal. Once this supply runs out, the tiger graph is going to record a steep fall, as the impact of disturbed conditions is going to affect the reproductive processes. The roar of tractors, shouts of men, the presence of innumerable cattle and the burning of heavy grasses in March and April is not conducive to normal gestation, apart from the casualties which are likely among the litter due to these fires. The indiscriminate issue of firearm licences is another menace, and most of the tigers I have seen shot over the last few years have had gunshot wounds.

The tiger is potentially dangerous, but so is a 5-ton truck with a drunken driver. Normally the tiger does not prey on man, hunts at night to keep out of his way, and does not wish to be disturbed. A tigress with young will charge, but in most cases this is a noisy demonstration provided the man does not try to run away. The courting tiger may show his annoyance, and the tiger disturbed on a natural kill may contest its possession, but it is really only the wounded tiger which is fury incarnate. He will charge into a line of elephants, leaping on to its head and often bringing the mighty pachyderm to its knees. Then it is sinew and muscle facing the blast of cordite, tooth and claw met with high velocity bullets, and uninhibited primeval fury of the beast, opposed by modern weapons and the hope that a few ounces of lead will halt a few hundred pounds of destruction. This is the ultimate excitement wilfully sought by few, though it is the sportsmen's code that every wounded tiger must be followed up. Wedged in between are the various 'Safer' methods adopted to lay this mighty feline how, from sitting over water-holes at night with a powerful torch, or poisoning kills at the other end.

A gunshot wound, or porcupine quill, or other disability by which he is so incapacitated as to take to killing the easiest victim he can find despite the natural fear of the unknown, and the animal does fear the unknown. A larger proportion of tigresses among maneaters would also indicate that the times of stress while rearing a family have something to do with this condition. Such a tiger becomes a terrible scourge as Corbett's books demonstrate. But this is an unnatural state and even the worst maneater does not subsist entirely on human kills.

The concept of sport has so far been with a rifle, and the phenomenal bags of the nineteenth and early twentieth century will never be experienced again. Africa is a maturer country than India as far as the commercialization of hunting is concerned, and now there is a reaction against killing and many safaris are merely photographic. It is a species of evolution of humanism, a realization that sport does not reside in killing alone, and trophies are not only stuffed museum pieces. Shooting with a camera offers more to a sportsman or naturalist than

ever can a rifle. The excitement is more prolonged, as the quickest snapshot of a rifle can never be taken with a camera, which requires more favourable conditions. It is a harder and more individual work, but the results are so much more satisfying as to render any attempt at comparison superfluous. A pair of antlers on the wall, or a mounted skin is of interest only to the individual concerned, and really probably only till memory fades, and the mount loses its pristine freshness, but the photograph outlives time. Every look will bring back the tense thrill of knowing that a good picture has been taken, the many disappointments, and the climax which will never fade. Other observers can also appreciate the feline grace, the sylvan setting and the peaceful surroundings, undisturbed by violence and moral agony, for death is always ugly.

This article starting as an assessment sounds more like an apology, but this is in the fitness of circumstances. Memories will fade with time, but India will – one hopes – always remain the land of tigers.

The Incredible Egg

Bird eggs are protective life-support systems complete with all the nutrients, minerals and water a developing bird needs before it hatches.

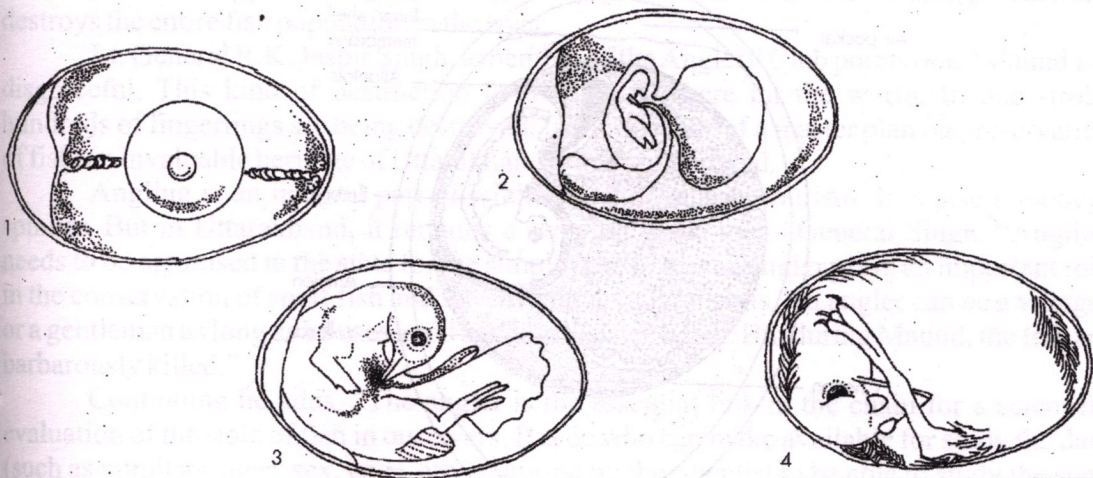
Here's a look at the main parts of an egg containing a growing embryo.

Shell: The shell protects the egg and keeps it from drying out. It is mostly made up of calcium carbonate, some of which will be broken down and used to develop the bones of the embryo. This break-down of calcium carbonate also weakens the shell, making it easier for the young bird to hatch. Though the shell appears completely solid, its surface is permeated by thousands of microscopic holes or pores. The embryo exchanges oxygen and carbon dioxide through these pores.

Shell Membrane: The egg has an inner and an outer shell membrane. The two membranes are fused together, and to the shell except as the wide end of the egg. Here the inner shell membrane separates from the outer shell membrane, forming a pocket of air. Before pipping or breaking the shell the fully developed bird will break through the inner shell membrane to this pocket and breathe air for the first time.

Albumin: This is the egg white. It is mostly water with about 10 per cent protein and a small amount of minerals. The albumin keeps the embryo from drying out, helps support the yolk, and is a source of protein and minerals for the embryonic bird. Most of it will be used by the embryo during its development.

Yolk Sac: The yolk (i.e. the yellow part of the egg) sac contains the developing bird's food source, the yolk. The yolk is made up of proteins, fats and carbohydrates and is connected to the bird by blood vessels that spread out across the sac's surface. A day or two before hatching, what's left of the yolk sac and yolk is drawn into the bird's abdomen through its umbilical cord. For a while after it hatches, the bird can use this left over yolk as an extra food source.



Egg Facts

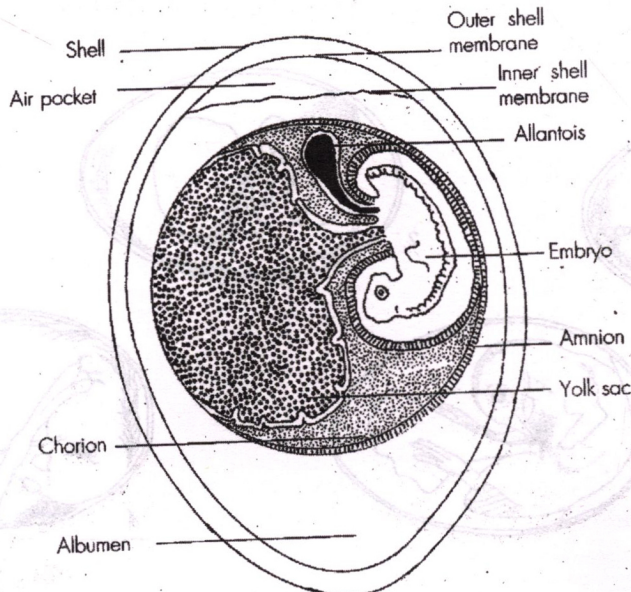
Colour of eggs

Glossy white
 Pure white
 Chalky white
 Cream coloured
 White tinged with green
 Pale creamy pink green
 Glossy greenish brown
 Blue green
 Pale bluish green
 Pale green
 Turquoise blue
 Turquoise, glossy colour
 Stone colour
 Stone coloured or greyish
 brown, blotched with black
 Pale clay
 Pale or dark sandy
 speckled with red

Bird

Small Bee-eater
 Coucal, Grey Pelican
 Flamingo
 Grey Wagtail
 Indian Pitta
 Pheasant-tailed Jacana
 Glossy Ibis
 Great crested Grebe
 Grey Heron, Night Heron
 Common Hawk-Cuckoo
 Rufous Babbler
 Jungle Myna
 Coot
 Redwattled lapwing
 Indian Courser
 Indian Moorhen

Main parts of an egg



Cheetal Quarterly News

19th All India Forest Sports Meet Held in Dehradun Uttarakhand from 16th to 20th Dec. 2011.

19th all India Forest Sports meet was held in Dehradun from 16th to 20th Dec. 2011 under the chairmanship of Dr. Raghubir Singh Rawat Principal Chief Conservator of Forest Uttarakhand. The meet was hosted by Forest Department Uttarakhand and majority of events particularly athletics and the inaugural and closing ceremonies were held in IGNEFA sports ground. The meet was inaugurated by Honorable Chief Minister of Uttarakhand Major Gen. (Retd.) B.C. Khanduri and HH The Governor of Uttarakhand Smt. Margret Alva was the Chief guest at the closing ceremony. Nearly 2000 participants from all over the country including institutions like FRI, WII and IGNEFA took part in the games. The event was highly rewarding for Uttarakhand who bagged the first position among all teams. In the 18th sports meet held in Bhopal MP. Uttarakhand was at the 16th position. It was a well organized event highly appreciated by participants, organisers and viewers.

Something fishy about it

**DURING THE MAUND FISHING FESTIVAL, SACKS FULL
OF INTOXICATING POWDER ARE POURED IN THE RIVER
TO KILL FISH ON A MASS SCALE, COMPLAIN MEMBERS
OF DEHRADUN ANGLER'S CLUB**

Anjali Nauriyal, Mohini Road

Members of the Environment and Angler's Club of Dehradun have come down heavily on the Maund Fishing festival that it held every year in July in the Aglar Valley. Their objection is to the methodology of killing the fish by pouring sacks full of an intoxicating powder that destroys the entire fish population in the river.

Lt. General R.K. Jasbir Singh, a member of the Anglers' Club points out, "Maund is a disgraceful. This kind of destruction is allowed nowhere in the world. In one stroke hundreds of fingerlings are being destroyed. In the absence of a master plan on preservation of fish, an invaluable heritage of Uttarakhand is being destroyed.

Angling is an integral part of wildlife and adventure tourism. It is also a money-spinner. But in Uttarakhand, it remains a sleeping giant, avers General Singh. "Angling needs to be organised in the state for the simple reason that an angler plays an important role in the conservation of sport fish and the environment it inhabits. An angler can be a villager or a gentleman as long as he uses a rod and line to catch a fish. But during Maund, the fish are barbarously killed."

Continuing he adds, "The angler is the essential link in the chain for a scientific evaluation of the state of fish in our rivers. It is he who can make available for study the data (such as numbers, ages, sex, eggs, etc.) required by the scientist to be able to study the state

of fish in a particular stretch of river. But above all armed with a fishing permit, he is the best deterrent to poaching and the indiscriminate slaughter of fish. He is the best custodian not only of the stretch of river allotted exclusively for his fishing, but for the entire neighbouring riverine system, acting as he does as an extension of the official Fishery Department's supervisory staff."

The point that the club members are trying to make is that anglers, if they are lucky, will be able to catch 10 to 12 fish of a limited size and weight. Compared to this, the amount of fish destroyed by poisoning, bombing and electrocution, etc. is anything upto a hundred fish at one blow.

In Uttarakhand, there appears to be no policy in place to protect the fish population and make the anglers abide by the rules and regulations laid down by the forest and fishery department.

"We as members of the club enjoin on our members to use only rod and line in fishing and to return to the waters Masheer and other fish of less than one kg and more than ten kgs and trout of less than half kg. Members are warned not to fish without valid fishing licences and to report any infringement of the law to the nearest DFO, whom they are bound to assist," says General Jasbir.

It will be of interest to non-anglers to know that large fish are religiously returned to the waters after being weighed, photographed and other relevant data being recorded.

Says Upendra Arora of Natraj Publishers the Green Shop, "The Mahseer, which is at the top of the biological food chain in this region, has rightly been classified as the finest sport fish Garhwal and Kumaon rivers. But today it is fast disappearing. There was time when we printed many exceptional books on angling by some of the greatest anglers of the time. But today in our state which is the land of the limitless possibilities, no one seems to care."

With the Mahseer other sport fish too, observe General Jasbir, are becoming rarer and rarer.

The causes for the depletion of such sport fish are manifold. A paper submitted by the Anglers' Club, Dehradun, for the National Bureau of Fish Genetic Resources give details of the damage caused to the habitat of the fish and the necessity for taking immediate remedial measures to prevent further irretrievable damage to the sport fish.

The club members urge the Uttarakhand government to first shortlist all suitable localities that should be developed on a priority basis. Top priority must be given to known fishing localities where fish are still in fair abundance. Stretches of rivers must be identified should be protected and vigorously patrolled, and above all, the involvement of the villagers should be ensured in the overall schemes for reviving and stabilising the fish population at acceptable levels for encouraging fishing.

The road map

Minutes of Meeting of General body of Wildlife Preservation Society of India held on 29.04.2012

A meeting of general body of WPSI was held at 300, Model Colony, Araghar, Dehradun on 29.04.2012 under the Chairmanship of Sri. R.K. Mehta, Chief Patron of the Society. It was heartening to see a good attendance. The attendance sheet is enclosed.

The agenda item wise discussion and decisions taken in the meeting are detailed below:

Agenda Item No. 1- Approval of sale of Office Premises of the Society at 7A, Astley Hall, Dehradun by the competent court and investment of sale proceeds as per direction of the Court.

The sale of Office premises of the Society at 7A, Astley Hall in Rupees One Crore and fifty eight lakhs to M/s Hill Queen Realtors Private Ltd., 74/1 Narishilp Mandir Marg, near Bindal Bridge, Dehradun duly authorized by the competent court was approved by the General Body. The members were informed that the sale proceeds were directed to be invested in Govt. Bonds (50 lakhs), fixed Deposit (50 lakhs) and purchase of new office for the Society (58 lakhs) by the Honorable court. The amount of Rs.50 lakhs have been put in FD in PNB on maximum available interest rate which was approved by the General Body. Rs 58 lakhs intended for purchase of new office of the Society have also been put on short term FDR in PNB which was also approved.

Regarding investment of Rs. 50 lakhs in capital Gain Bonds, the President – Mr. A.S. Negi and Honorary Secretary of the Society – Mr. R.P. Kala were authorized by the General Body to put up an application and proceed further as per rules and direction of the Honorable Court.

The efforts of the Sub Committee formed in the General Body meeting on 17.04.11 in getting offers and putting up the case to competent court getting approval of the Honorable Court and to conclude the Sale well in time were highly appreciated by all present.

Agenda Item No. 2- Purchase of new office building for the Society

The General Body was informed about the two offers of sale that had so far been received for above purpose. After deliberations following Sub Committee was formed to explore more offers and suggest most suitable location with comparative chart of cost, location suitability and available space to the executive committee for finalization of most suitable and cost effective case within one month.

- | | | |
|-----------------------|---|----------|
| 1. Dr. Prashant Singh | - | Chairman |
| 2. Dr. S.P. Singh | - | Convener |
| 3. Mr. Jaideep Datta | - | Member |
| 4. Mr. S.K. Banerji | - | Member |
| 5. Mr. Vijay Nath | - | Member |

One of the offers that had been received and one more case in the knowledge of members were inspected after the meeting by the committee along with other members present in the meeting. It was decided that the case finalized in the Executive Committee will be final and necessary action to purchase the property, sign papers and take possession will be taken by the President, Hony. Secretary and the Treasurer of the Society which will be informed to the General Body in the next meeting.

Agenda No. 3 – Stepping up the activities of the Society and invitation of new proposals from the member.

After Deliberation following proposals were received from the members.

1. Education trips to wilderness areas for the members of the Society and of the school students.
2. Campaign for garbage cleaning alongside of roads in nearby forest areas.
3. Plantation drive
4. Events on Wildlife week and other important days related to environment and conservation.
5. Film shows on wildlife in schools and villages around Rajaji NP.
6. Launching of Website/Blog/Face book of the Society.
7. Preparation of mementos, greeting cards etc.

It was decided that to pursue and carryout these and other activities a full time/part time professional or Research fellow could be engaged. A suitable person will be located and if the arrangement can be worked out with him then the matter can be put up to the Executive for approval. Till then details of each activity may be prepared and put up to the Executive Committee in the next meeting.

Agenda No. 4 – Suggestion for improving quality of the Society's quarterly Journal "Cheetal"

Following suggestions were received:

1. Dr. Dushyant Gaur offered to improve the fonts & formatting.
2. Registration and other up gradations and even peer reviewing of the Journal could be taken up.
3. Putting the Journal on the Website of the Society.
4. A campaign for popular articles and research articles for the Journal should be launched by all members to improve the quality of matter. All members were requested to make necessary efforts.
5. Inclusion of advertisements of environmental friendly products should be done to meet part of the printing cost.

Agenda Item No. 5 – Enhancing the Salary of Mr. Praveen Rawat, Administrative Officer of the Society.

It was unanimously decided to enhance the salary of Mr. Rawat to Rs. 3500/- pm with some appropriate conveyance allowance.

Agenda Item No. 6 – Approval of Accounts of the Society for the financial year 2011-12.

The accounts of the Society prepared by M/s Sachin Aggrawal and Co. Chartered Accountants for 2011-12 was circulated to the members and passed.

Agenda Item No. 7 – Any other Item

Prof. J.S.Bali suggested the following:

1. Starting State Chapters of the Society under guardianship of Chief Wildlife Wardens of the States for better results.
2. Conducting annual All India and occasional international conferences of the Society to give boost to the image of the Society at national and international level.

Once the Research Fellow is put in place then possibility of such important activities could be explored and carried forward.

(A.S.Negi) IFS,Rtd.
President



Phone : 0135-2652410

THE WILDLIFE PRESERVATION SOCIETY OF INDIA

(Established 1958)

Heritage Apartment Flat No. 2 First floor, 18 New Road, Dehra Dun.

APPLICATION FORM

I

hereby apply to be admitted as a Patron / Life / Annual / Affiliated / Institutional / Student Member of the Wildlife Preservation Society of India.

My interests are

Name

Designation

Address

Phone No. & Email

Date of Birth

MEMBERSHIP

All Members get Cheetal (Quarterly) Journal FREE

- | | | |
|----|---|--|
| 1. | Patrons : | Rs.25000.00 and above |
| 2. | Life : | Rs.4000.00 |
| 3. | Annual : | Rs.400.00 subscription per annum
(April to March) |
| 4. | Students (School) | Rs.200.00 per annum |
| 5. | Affiliated : | |
| | (Others similar bodies) | |
| 6. | Institutional | |
| | (Messes, Units, Schools, Colleges,
Govt. Deptts., Corporations,
Societies, NGOs etc.) | Rs.500.00 per year |
| 7. | Institutional Life | Rs.5000.00 |

All Communications may please be addressed to the Hony. Secretary.

Signature

Signature

The Wildlife Preservation Society of India

1. The aims and objects of the Society are as follows :-

- (a) To promote interest and impart knowledge regarding the preservation and conservation of all forms of wildlife, particularly among the youth of the country.
- (b) To cooperate with the Govt. of India and State Governments and with others Societies and Institutions having similar aims and objects in working for the interests of wildlife.
- (c) To assist in enforcing and actively supporting the Forests Acts. Wild Birds and animals Protections Acts and Rules etc. of State Governments and the Indian Arms Act and Rules in so far as they pertain to wildlife and to bring to the notice of the authorities any infringement of the same and to assist in the detention and prosecution of offenders in respect of such laws.
- (d) To advise and help the Govt. and wildlife administrators in the formation, maintenance and protection of Sanctuaries and National Parks, preservation of wildlife in general and endangered species of India in particular and in the introduction of exotic species into the country, rehabilitation of endangered species etc. and in the formulation and amendments of rules and acts, so as to conserve and increase wildlife stocks.
- (e) To raise funds for carrying out the above aims and objects and to found and maintain museums reading rooms and libraries of natural history in order to disseminate knowledge regarding wildlife.
- (f) To carry out publicity and propaganda for the preservation of wildlife in India by means of monographs, journals, films, filmstrips and other feasible methods.
- (g) To assist members of the Society in obtaining facilities for viewing and photographing wildlife in India.
- (h) To conduct research into the problem of Wildlife management in India, and in pursuance of this, to initiate, encourage and, where possible assist in the projects of the study of threatened species and related objects and to provide reference and research facilities for such work.
- (i) To carry on such other activities which will serve the above subjects.

2. What membership of Wildlife Preservation Society of India will entitle you to ?

- (1) You will become an active member of the growing group of Wildlife enthusiasts, who enjoy working for and spreading the knowledge of how to conserve India's heritage of wildlife for posterity.
- (2) You will be entitled to the full use of the library of the Wildlife Preservation Society and of its reading room.
- (3) You will receive a membership certificate.
- (4) You will receive a personal Identification and Membership Card.
- (5) You will be entitled to buy all publications of the Society at a concessional rate.
- (6) You will be entitled to buy at concessional rates the Societies Greeting Cards, Calendars, Tie, Label badges and the Balance of Nature Game (specially Published in colour for its educative and recreational values).
- (7) You will be supplied "Cheetal", the quarterly journal of the society free.

3. For membership particulars write to Honorary Secretary, Wildlife Preservation Society of India Heritage Appartment Flat No. 2 First floor, 18 New Road, Dehra Dun.

The Wildlife Preservation Society of India

Patrons:

- (i) Mr. Ravi Singh CEO & Secretary General WWF-India
- (ii) Managing Director Uttarakhand Forest Development Corporation, Dehradun.
- (iii) Director Uttarakhand Council of Science and Technology, Dehradun.

1. President –

Mr. A.S. Negi IFS (Rtd.)

300 Model Colony, Argaghar, Dehradun.

2. Hony. Secratry-

Dr. Rajendra Prasad Kala

"SANTAU BHAWAN" H.No. 120, Pocket-3
Indira Enclave, Harbanswala, P.O. Mehuwala,
Via Majra, Dehradun

2. Executive Vice President –

Mr. Rajeev Mehta,
Chitra Cinema, Haridwar.

3. Vice President –

Mr. S.K. Banerjee,

53 Inder Road, Dalanwala, Dehradun

4.Ex. Officio Vice President Eastern Zone- CWLW Assam.

5.Ex. Officio Vice President Southern Zone- CWLC Tamil Nadu

6.Ex. officio Vice President Western Zone- CWLW Rajasthan

7.Ex. officio Vice President Northern Zone- CWLC Madhya Pradesh.

8.Hony. Treasurer –

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